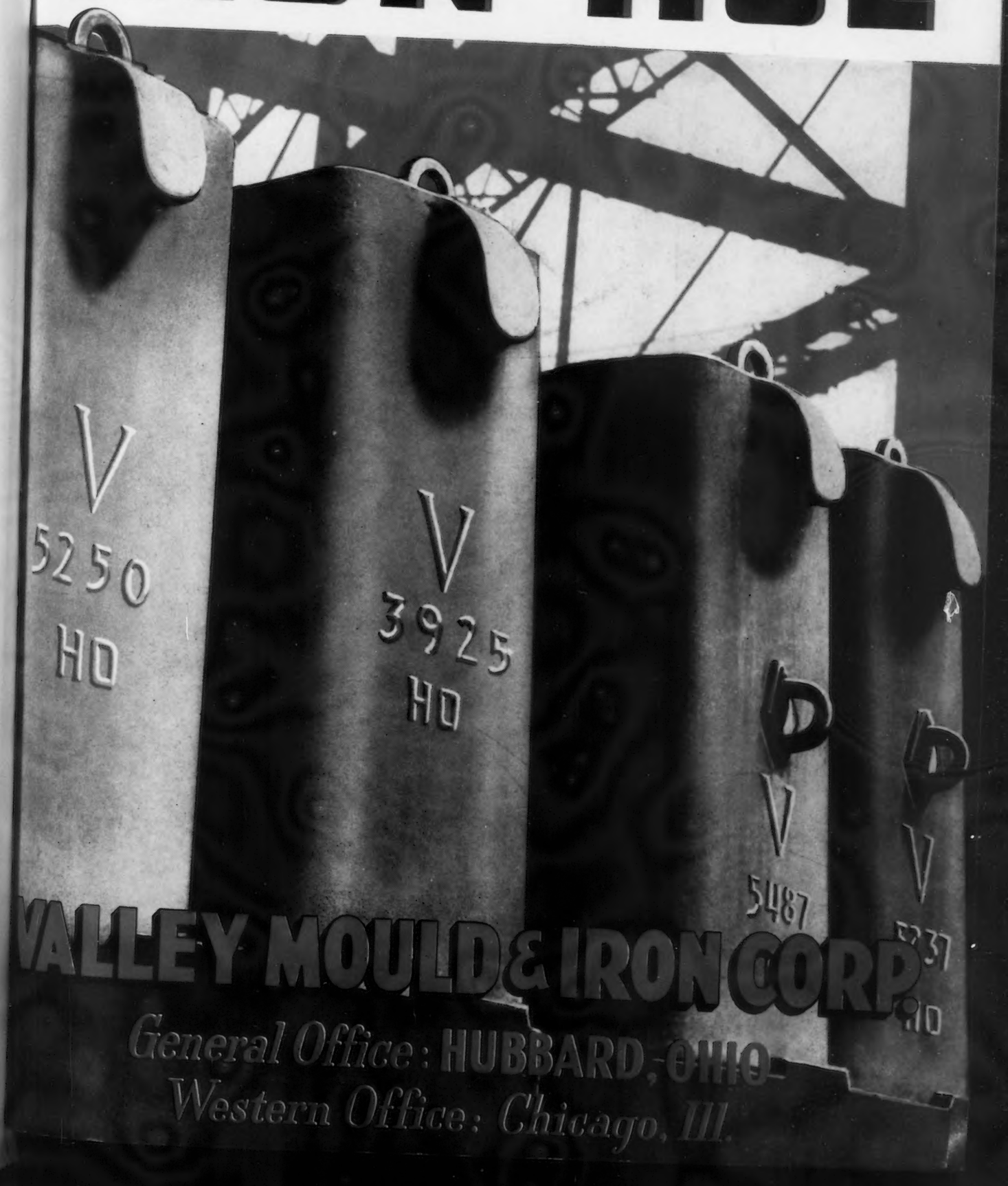
East Engine Library

MARCH 4, 1943

The IRON AGE

MAR 5 1943



WAR SERVICE BRINGS OUT *its* EXTRA CAPACITY

The general superintendent of a plant now on war work remarked to one of our representatives:

"This war effort has given us a real chance to learn about the production rates of our machine tools. Now, with the close tolerances and fast production demanded by the various governmental agencies, we find that Warner & Swasey stands out head and shoulders in our turret lathe department."

Yes, under war pressure thousands of Warner & Swasey turret lathes are being worked continuously, 24 hours a day, month after month, without breakdown or time out for repairs. In this emergency of high speed production on precision work, Warner & Swaseys are given full opportunity of proving they can turn metal better—and faster.

And when war against the Axis ceases, there will be another "war period"—a war against unemployment, lower standards of living, and enormous per capita debt,—another "war" which can only be won by production! In that period it will be our challenge to design and build turret lathes that will out-produce the turret lathes that today seem to be the last word.

WARNER & SWASEY FOR VICTORY

YOU CAN TURN IT BETTER, FASTER, FO
LESS . . . WITH A WARNER & SWASE

MARCH 4, 1943
VOL. 151, NO. 9

J. H. VAN DEVENTER
President and Editor
C. S. BAUR
Vice-President and General Manager

o o o

Managing Editor, T. W. LIPPERT
News & Markets Editor, J. A. ROWAN
Technical Editor, F. J. OLIVER
Associate News Editor, D. R. JAMES

Associate Editors
D. C. MacDONALD S. H. BARMASEL
J. I. BUTZNER R. E. BENEDETTO
Art Editor, F. J. WINTERS

Editorial Assistants
M. M. SCHIEN G. B. WILLIAMS
G. P. BUTTERS

Resident District Editors
L. W. MOFFETT, Washington
T. C. CAMPBELL, Pittsburgh
J. D. BROWNE, Washington
W. A. PHAIR, Chicago
T. E. LLOYD, Cleveland
S. H. BRAMS, Detroit
QSGOOD MURDOCK, San Francisco

Editorial Correspondents
W. P. DEARING, Buffalo
ROBERT G. McINTOSH, Cincinnati
G. FRAZAR, Boston
R. RAYMOND KAY, Los Angeles
HUGH SHARP, Milwaukee
JOHN C. McCUNE, Birmingham
F. SANDERSON, Toronto, Ontario
ROY M. EDMONDS, St. Louis
C. H. BACON, Seattle

o o o

A. H. DIX, Manager, Reader Service

o o o

Advertising Staff
Robert P. Blair, 621 Union Bldg., Cleveland
B. L. Herman, Chilton Bldg., Philadelphia
H. K. Hottenstein, 1012 Otis Bldg., Chicago
R. Raymond Kay, 2420 Cheremoya Ave., Los Angeles, Cal.
H. E. Leonard, 100 East 42nd St., New York
Peirce Lewis, 7310 Woodward Ave., Detroit
C. H. Ober, 100 East 42nd St., New York
W. J. Fitzgerald, 428 Park Bldg., Pittsburgh
D. C. Warren, P. O. Box 81, Hartford, Conn.
O. L. Johnson, Market Research Mgr.
B. H. Hayes, Production Manager.
R. E. Baur, Typography and Layout.

o o o

Member, Audit Bureau of Circulations
Member, Associated Business Papers
Indexed in the Industrial Arts Index. Published every Thursday. Subscription Price North America, South America and U. S. Possessions, $8; Foreign, $15 a year.
Single Copy, 35 cents, Annual Number, $2
Cable Address "Ironage N. Y."

o o o

Owned and Published by
CHILTON COMPANY
(Incorporated)

Executive Offices
Chestnut and 56th Sts.
Philadelphia, Pa.
U.S.A.

Editorial and Advertising Offices
100 East 42nd St.
New York, N. Y.
U.S.A.

OFFICERS AND DIRECTORS
C. A. MUSSELMAN, *President*
JOS. S. HILDRETH, Vice-President
GEORGE H. GRIFFITHS, Vice-President
EVERIT B. TERHUNE, Vice-President
J. H. VAN DEVENTER, Vice-President
C. S. BAUR, Vice-President
WILLIAM A. BARBER, Treasurer
JOHN BLAIR MOFFETT, Secretary
JULIAN CHASE, THOMAS L. KANE,
G. C. BUZBY, P. M. FAHRENDORF,
HARRY V. DUFFY CHARLES J. HEALE

This Week in . . .

THE IRON AGE

Editorial

Door Openers for State Socialism 47

o o o

Technical Articles

Is Steel a Laggard? 49
Finishing Metals by Band Filing 54
Production Experience with NE Steels 57
Manufacture of Bayonets 62
Training Program Aid for Industry 66
Electro-Brazing with Water-Cooled Tongs 67
Accelerated Fatigue Tests on NE Steels 68
New Equipment: Welding 71

o o o

Features

Assembly Line 76
Washington 80
West Coast 84
Fatigue Cracks 88
Dear Editor 90

o o o

News and Markets

This Industrial Week 92
News of Industry 95
Personals and Obituaries 160
Machine Tool Activity 162
Non-Ferrous Metals 164
Scrap Markets 166
Iron and Steel Scrap Prices 168
Comparison of Prices 169
Finished Steel Prices 170

o o o

Index to Advertisers 261

Copyright, 1943, by Chilton Company (Inc.)

MAHON *Weldments*

Unusual work like this massive Multiple Unit Drilling and Tapping Machine Base demonstrates Mahon welding skill.

Many New Welded Steel Plate Products Now Are Fabricated by Mahon

In addition to welded steel machine bases, Mahon welding skill is being utilized for the fabrication of many new and different products. Gun mounts, furnace casings, engine frames and crankcases, pump supports, electrical, gas and hydraulic equipment, comprise but a few of many items that Mahon facilities are called upon to produce. Let us look over blueprints of *your* requirements. Regardless of size or shape or purpose—if they can be practically and economically fabricated from steel plate—we will advise you. Quotations will be promptly supplied.

Fabricators of Machine Bases and Frames and Many Other Welded Steel Plate Products.

THE R. C. **MAHON** COMPANY

DETROIT
CHICAGO

THE IRON AGE

MARCH 4, 1943

ESTABLISHED 1855

Door Openers for State Socialism

ONE of the common purposes on which capital, labor and management can unite is to assure the survival of the principle of growth.

Nature fashioned that principle and applied it to all living things. Nature believes in small beginnings. The whale, the elephant and the redwood tree as well as men and women were not summoned into being full grown. They started small and if they successfully met the requirements of environment, they gradually grew to full stature.

Men have long applied this principle of growth to business and industry. It has been most successfully applied in our own country which now has over 2,000,000 individual going concerns. Some of these employ as many as 100,000 people, but all of them started small.

Manufacturing plants, like plants of the vegetable kingdom, do not last forever. A successful country must have new crops of them coming along and must also provide an atmosphere conducive to their growth. New plants and new business concerns with opportunity for growth spell employment, more and better wages, profits, better living and flourishing trade. These things are good for everybody.

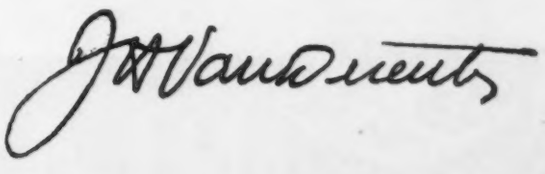
America, in particular, has been a land of opportunity for growth. For opportunity for the man with an idea but little or no money to establish a business. Henry Ford is an example of that, but only one of many.

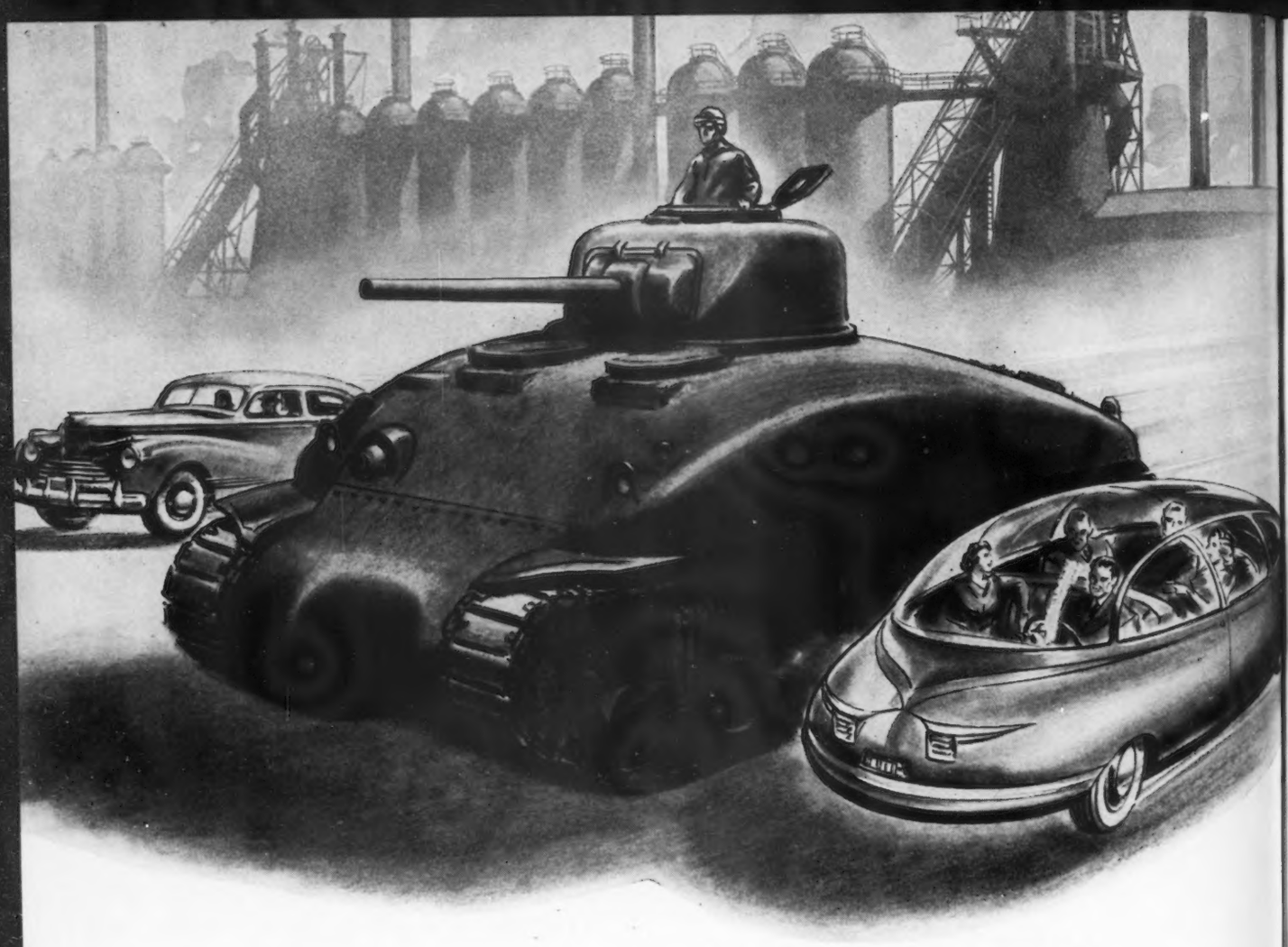
There was a toolmaker working for Ford some years ago, for example, who kept his eyes open and his brain busy. He conceived the idea that many of the special tools and dies used in making automobiles could be made in a specialized tool and die shop and sold to the automobile makers at a profit, yet at less than the cost to make in a plant where toolmaking was only a side line.

Private savings, willing to take a chance, helped this man to carry out his idea. Today he is head of one of the most successful tool, die and machine tool plants in the world and employs thousands.

If there had been a twenty-five thousand dollar limit to private earnings in those days, the private savings would not have been available to finance this man's idea. And if he had gone to Washington to get the money from an alphabetical agency they would have either turned down his modest requirements or loaned him ten million dollars, either of which would have been fatal.

If we are to have a multitude of little business and industrial seeds planted to assure us of future harvests of employment and wages, we must preserve the opportunity for private investments. Labor has the biggest stake in this preservation. It can well afford to fight, with capital and management, the half-baked schemes disguised as war measures which are actually door openers for state socialism and state ownership.





From Automobiles to Tanks *and Back to Automobiles*

Throughout the years before Pearl Harbor, Inland supplied great quantities of many kinds and forms of steel to the automotive industry. When a manufacturer wanted steel of special form, finish, or analysis, Inland research and mill men supplied those wants. Often original work by our research staff developed new steels, which were used to build better automobiles. Inland grew with the automotive industry and that industry grew with Inland.

When war came to America, Inland was prepared, with skilled men and modern equipment, to supply a vital part of the steel needs of the automotive industry, converted 100% to the production of army trucks, tanks, jeeps, shell, and many other kinds of war equipment.

Now as in the past, Inland metallurgists and mill men are making new and better steels—steels that give our fighting men the advantage—steels that will help build better automobiles when our enemies have met the terms—"unconditional surrender."

SHEETS • STRIP • TIN PLATE • BARS • PLATES • FLOOR PLATE
STRUCTURALS • PILING • RAILS • TRACK ACCESSORIES • REINFORCING BARS

ARMY E NAVY

INLAND STEEL CO.

38 S. Dearborn Street, Chicago • Sales Offices: Milwaukee, Detroit, St. Paul, St. Louis, Kansas C

IS STEEL A LAGGARD?

° ° °

By FREDERICK D. FOOTE
President, Alloys Development Corp., Pittsburgh

° ° °

...Plastics, the light metals and plywood are all energetically challenging rolled steel's dominance in the post-war "materials battle." Will the steel industry capitulate or can it protect its markets or even invade hitherto ignored markets. That is the theme which the author, a well-known steel executive, develops herein.

A SITUATION is developing in the utilization of materials which those who are interested in the post-war fortunes of the rolled steel industry need to examine closely. The pace of shifting technology is becoming very swift. Is rolled steel —an old and distinguished contender —getting in trim to hold its own, not to say forge ahead, in the face of a group of impressive newcomers in the field of structural materials? If the industry doesn't gird up its loins for the coming battle it won't be for lack of forewarning, because truly startling predictions are being made concerning aluminum, magnesium, plywood and the plastics, their mounting output, wider applicability and much lower selling prices.

The references made in this discussion to the improved properties of these new materials, now looming up as serious contenders for markets hitherto held securely by rolled steel, are by way of posing the problem which the steel industry must solve if it would ward off many costly encroachments and hope to maintain a dominating position in the world-wide trend towards lighter and more efficient structures. The writer's sympathy and confidence reside with the steel industry and none could hope more than he that the job at hand will be tackled and thoroughly disposed of. With this purpose in mind it seems wise to review the disturbing claims now being made quite openly by steel's new competition.

An annual productive capacity is being created for more than one million tons of aluminum, a total six times that existing in 1940. Of this new capacity some part of 500,000 tons may be dismantled when the war ends because of a cost level regarded as too high to be supported by a peacetime economy. However, producing facilities, once created, have a way of holding on for one reason or another; but, assuming that such will not prove the case in this instance, there will still remain a capacity equivalent to three times the largest pre-war output, and with a much lower selling price. This quantity of aluminum would be more than adequate to build new each year as many railroad passenger cars as are now being operated in America. It is claimed that the use of aluminum and transparent plastics will reduce the weight of the post-war auto by about one-half. This is a disturbing thought because, should it happen, steel as a structural material could be largely eliminated from the pleasure car. No doubt it would remain in the heavier commercial vehicles.

Aluminum "Imagineering"

Something like 20 per cent of steel production has been consumed by this industry in recent years, and 80 per cent of the total went into pleasure car construction. Come peace, few doubt that motor cars will again "sell like hotcakes." Is it any wonder that the steel industry's mouth waters when it considers that x-millions of cars times y-tons per car promises a huge post-war market? If motor car design should remain as static as wishful thinking indicates, this equation would hold, but the aluminum interests seem to have disposed of such thinking with one broad stroke. They are working a 24-hr. day, seven days per week, to win the war, but they have discovered, nevertheless, an "eighth" day to devote to "imagineering." Imagineering—a synthetic word newly coined by them to describe a highly productive activity involving a combination of metallurgy, engineering, and imagination applied to the development of new post-war products and uses to absorb their greatly increased output. As a result of this "imagineering" they would use 500 lb. of aluminum to reduce the weight of the post-war auto by 1000 lb. Whether they can achieve this objective remains to be seen, because one cannot help but feel that the rolled steel industry will undertake some "imagineering" on its own account to prevent it.

The industry can count on a period of grace in which to build its defenses, judging from recent statements of leading thinkers in the automotive industry that there will be no time before the war ends to tool up for the "dream" car of the future. They say that the public can expect little improvement in its post-war pleasure car over the familiar 1942 models. But according to Dr. Chas. M. A. Stine, vice-president of duPont, this period is likely to be of very short duration. Said he at the recent convention of the American Chemical Society: "Fuels and metals and plastics are now ready to complete the revolution in transportation, begun early in the century. The automobile manufacturers' slate has been wiped clean for a fresh start, which should

result in new cars that will be of incredible efficiency, judged by present standards. Since motor car production stopped, the shiny new models that are now gathering dust in dealers' storerooms have aged, technically, at least two decades. We are now in the 1960's of motor cars as measured by the old pace of development" . . . . . Weights may be half what they are now, power will be up, and fuels may yield 50 miles to the gallon or better."

A similar story is in the making with respect to magnesium. The war output of this light metal, so lately regarded as something of a novelty, will be at a rate more than double that of aluminum in 1939. There are difficulties to be overcome in the fabrication of magnesium, but they will probably be met successfully in the course of time, and—as things go these days—a very short time, no doubt. Already the price level has been reduced to a point where it is about on a par with aluminum in its strength weight ratio and with a decided edge considering its stiffness factor. Keen competition is sure to develop between aluminum and magnesium, and this can scarcely help but make the going harder for steel.

Plywood will make a strong bid for many structural applications. The laminations of wood, bonded by resin, and the methods used in its manufacture and application, have so improved plywood that it now possesses superior characteristics to a plastic, and in fact resents being designated as a plastic. Plywood is very strong and light, does not splinter and is inherently fire resistant. It can now be formed and fastened satisfactorily. When measured by strength weight ratio and elastic stability, it stands first in the line of structural materials.

Perhaps the predictions which are now being made for the place this material will command in the structural field are premature, but it has made an impressive beginning in aviation, and is also finding wide application in the building industry, and for partitions in ship construction.

What About Plastics?

The writer tosses in his hand when it comes to the claims made for the future of the plastics. All customary methods of appraisal are confounded in learning that weeds are a potential source of plastic. As a hay fever sufferer it is amusing to contemplate whimsically that certain bath room fixtures might soon be made best from ragweed; but perish the thought that this devilish weed might be cultivated for such a source material.

After reading several articles on the many plastics and learning of the hundreds of companies established in recent years to produce them, one brought up in the commercial branches of the steel industry gets the notion that anything will make a plastic that must be reckoned with "even snakes and snails and puppy-dogs' tails." It seems in order to stand by for a "look-see" in this situation.

Inroads on Rolled Steel

Substantial inroads have been made already upon rolled steel markets by materials that are not new but which have kept well abreast of progress in the engineering world—indeed, have sometimes set the pace. Such is the case of cast steel, referred to later in this discussion.

An account of what seems in the offing, or has occurred, opposite the great consuming markets for structural rolled steel is in order at this point. In general it relates to structures which are of two classes, mobile and static. The former will be considered first.

In recent years the largest consuming market for rolled steel in moving structures of all kinds has been the automotive industry. Possible developments in this field, which could have dire consequences for steel, have been touched upon in the foregoing and need not be elaborated.

The aviation industry challenges one's powers of imagination — anything can happen here, but steel will have a battle on its hands to dominate any considerable part of this market. There may be a substantial place for the stainless types, and even some of the high tensile types, but this is not certain at the moment. There is no field in which a higher per-pound price can be paid for weight saving, hence the difference in cost, wide as it may be, between the highest and lowest priced materials will not determine their selection. In general, the highest strength-weight ratio and stiffness, or stability, will be the deciding factors. For this reason the light non-ferrous metals, plywood and plastics, groups do not fear the competition of steel in aviation. But aluminum, so recently king, is casting an anxious eye on both plywood and the plastics.

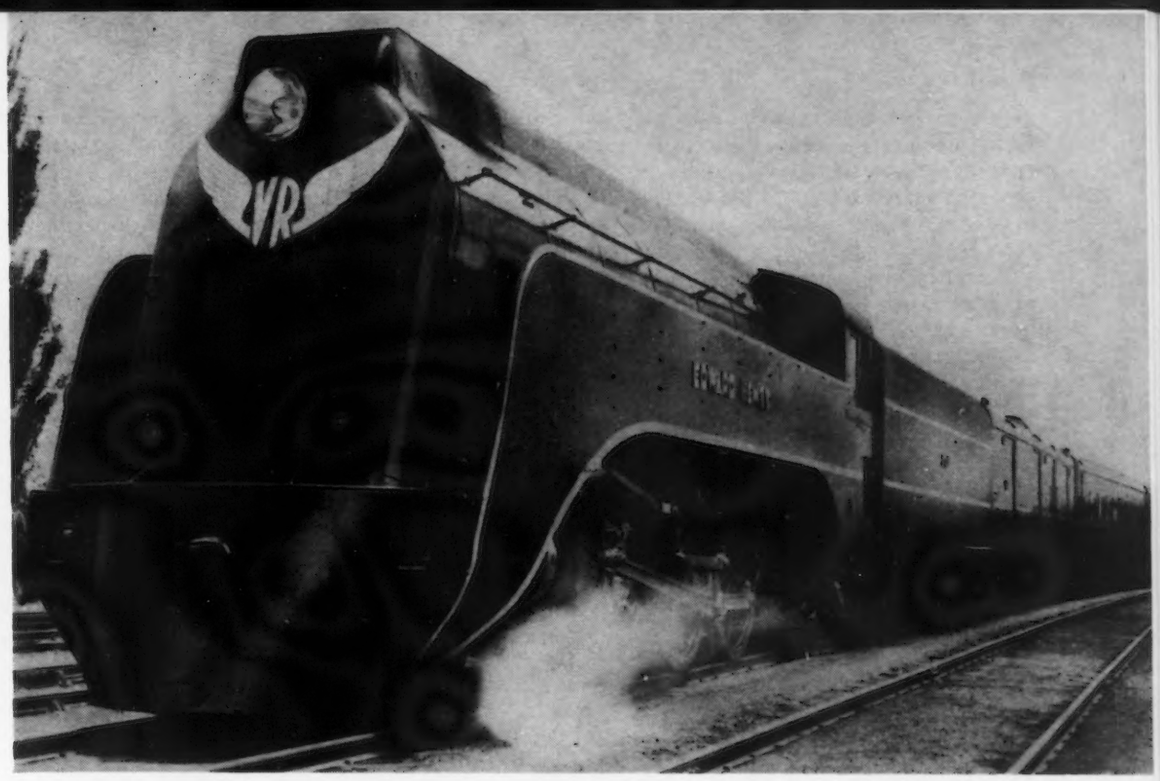
It isn't pleasant to contemplate that rolled steel's participation in the automotive market may be whittled down to relatively small proportions, and that steel may find little place in the enormously expanding demands of aviation, but if these conditions are not to eventuate the pressing need for a vigorous campaign in the realm of products research and development can hardly be over-impressed upon those who shape the destinies of the steel industry. The need has been pointed out by high-ranking technical and commercial advisors who have been watching the significant march of events, but, so far, no joint industry action has resulted, and marked advancement can be noted only with respect to individual companies, specializing on some particular products or processes. Here it should be emphasized that this discussion relates to structural materials only.

Turning to other markets, one finds more reason for optimism, but, again, much of the opportunity will be missed without full industry cooperation and an "imagineering" approach. There are still some in the rolled steel industry who believe that the introduction of the weight-saving steels in markets not seriously threatened by other materials was a mistake. They base their objection upon the premise that to advocate, deliberately, the lightening of structures is to engineer a reduction in the total tonnage demands of the market. Aside from the

o o o

BRICHENOUGH Bridge over Sabi River, Rhodesia, made of high tensile steel fabricated by Dorman Long & Co., Ltd., England. A single span of 1080 ft., this bridge was the third largest arch in the world at the time of its construction.

o o o



THE "Spirit of Progress", built and operated in Australia. This crack train is made entirely of Corten steel, a lightweight alloy combining great strength with considerable corrosion resistance.

knowledge that sound progress never works out that way, there is the plain fact that a swift succession of events in the structural world has made such a position untenable. The light weight development has become epidemic and rolled steel's job is to search for the best possible products to improve every type of structure and thus hasten those in existence over the brink of obsolescence. Engineering plans and service should be provided to show the all round economies of using steel in those applications where it can be proven that it rightfully belongs.

An examination of the railroad market presents some interesting possibilities. There is little equipment in this field which will not be worn out or obsolete when the war is over. Modernization will need to proceed swiftly, to meet the threat of ever greater competition from the highways, airways, waterways, pipe lines, and what not. The magnificent job the carriers are doing in the present emergency is a sound rebuke to all former critics. All agree, however, that they are eating into the bone and sinew of their facilities to perform the Herculean tasks now imposed upon them. Indeed the excellence of their accomplishment may prove a serious obstacle because, having succeeded so well, they may be deemed invulnerable and hence denied the equipment and manpower vital to the discharge of their growing wartime burdens. Should this occur, and the railroad plant fail, it could prove fatal to our whole war effort. There is reason to believe that such a stroke of bad management has already caught up with Hitler, and that his neglect of rail transportation may contribute heavily to Germany's downfall.

The railroads constitute a consuming market for rolled steel principally, and will undoubtedly continue to do so; however, there is competition in this field. For example, the cast steel industry has succeeded in extracting and retaining upwards of 500,000 tons of business from this market annually, which was formerly enjoyed by rolled steel. This was accomplished by patent pooling; joint research and products development within the industry; the adoption of standard specifications; the maintenance of uniform quality; engineering service to prospective customers; joint advertising and sales promotion; and, lastly, by adroit political maneuvers which resulted in writing rolled steel out of the picture in some notable instances.

The light non-ferrous metals have made some headway against steel in passenger car construction. Plywood and the plastics have also put in an appearance but, from an overall tonnage standpoint, these can hardly be regarded as a serious threat at present because passenger car construction represents such a small part of the demand for rolled steel. The *big market* in railroad rolling stock lies in the building of freight cars and here steel is well established. The objectives, which call so clearly for joint industry action in this division of the market, are, first, to expand the demand for rolled steel through measures which will hasten obsolescence, and, second, to stem the encroachments of competitive materials. That these objectives can be achieved through industry promotion of superior steels is already a demonstrated fact, and that they cannot be achieved otherwise is equally demonstrable.

Since 1935 there have been no railroad passenger cars or street cars built in America that did not embody "light weight" materials in their design. The high tensile steels and stainless account for approximately 90 per cent of the total, and aluminum for the balance. Over this period upwards of 50,000 modern lightweight freight cars of every type, built of high tensile steel, have been placed in service and operated most profitably. These new cars render the old heavy equipment uneconomical to operate and subject to retirement. K. F. Nystrom, mechanical officer of the Chicago, Milwaukee, St. Paul & Pacific, in an article entitled "Why Lightweight Freight Cars?", (*Railway Age*, November, 1938) said: "It is the author's conviction that some railroads rebuild cars or give them heavy repairs when it would be more economical to retire and replace them with new cars." Not more than three or four tons of steel are required to heavily repair a steel freight car whereas a minimum of eighteen tons of various steel products enter into the construction of a new car. Mr. Nystrom also stated that 2,000,000 new freight cars would be needed by the railroads over the next ten years, from 1938, and added: "The saving of $60 per car per year which would

result (from) reduced weight on the scale previously given (5 tons per car) applied to the 2,000,000 cars to be built would amount to $12,000,000 annually for each year the quota of cars are in service, and this saving will multiply as new quotas of cars are added each year, or a total saving in ten years of $660,000,000. To build 2,000,000 freight cars at a cost of, say $2,000 each would involve an outlay of $4,000,000,000, which would go a long way toward restoring employment and prosperity." Certainly the effects of the war, which Mr. Nystrom did not anticipate in 1938, should prove his estimate a most conservative one.

The mutual benefits to be derived by the rolled steel industry and the railroads from the weight-saving possibilities of the high tensile low alloy steels, used in modern welded design, are the most promising of any now predictable on the post-war horizon of either industry. For rolled steel, competition will be defeated and new and more profitable markets created by reason of the obsolescence caused and the higher priced materials involved; for the railroads, a means is provided for lowering operating costs and for discouraging new competition as well; for the nation, much greater employment.

Could anything be more important to the preservation of the American system of free enterprise, to say nothing of their own welfare, than that these two giants of industry should add an "eighth" day to their work week, now, in which to plan their peace-time futures.

Steel in Shipbuilding

The shipping industry constitutes another market which steel should dominate. Here, as with the railroads, the competition of new materials should be disposed of successfully. However, the Navy is making good use of aluminum for weight-saving purposes in warship construction, also plywood is finding its way into commercial vessels. Some of these light materials are sure to be adopted but, in this market, it is obsolescence once again that should provide the most promising growth in demand for rolled steel. Germany, Great Britain, France and Holland have been using an increasing tonnage of high tensile steel in ship construction over the past several years. The Europa, Bremen, Queen Mary, Queen Elizabeth, Normandie and Champlain are known to have used substantial quantities of high tensile steels in their designs.

In a paper presented in November of last year at the annual meeting of the Society of Naval Architects and Marine Engineers, Edgar P. Trask of the firm of Gibbs & Cox, explored the advantages of using the high tensile steels in ship construction. Taking an oil tanker as an example of the increased earnings possible due to weight reduction, Mr. Trask said, in part:

"The ship is considered in service between New York and Port Arthur, Texas, a distance of 1875 miles. If the sea speed is 14 knots, and the turn-arounds are made in a day each, the total time for the round trip will be 14 days. With an allowance of 15 days for annual overhaul, there will be 25 round trips per year. The 380 tons extra deadweight increases the pay load 9500 tons per year, which for oil at 50 degrees Baumé is 78,200 more barrels carried per year. At a freight rate of 23 cents per barrel, the added income per year would be $10,000. What small cost there might be of handling the added cargo is neglected.

"If the base labor cost is 10 per cent more than for mild steel, the added annual net income of the ship of high elastic steel over that of mild steel would be $11,800, which is 32.4 per cent of the estimated added first cost. If the labor rate is the same, the ship of high elastic steel costs less and earns $19,800 more per year.

"A further saving should be effected by the 100 per cent added durability of the high elastic steel. If in the 20-year normal life of a mild steel tanker, one major rebuild is needed after 14 years, none should be needed in that time for the ship of high elastic steel. After 20 years both ships would probably suffer from obsolescence. Assume the rebuilding of the mild steel ship to require sixteen weeks' time and the replacing of 800 tons of steel at a cost of $450,000. During this time eight round trips would be lost and, if the net profit for carrying 128,000 barrels of oil on each voyage is 8 cents per barrel, the lost income and cost of structural overhaul are about $532,000, or $26,000 per year. This becomes a gain for the ship of high elastic steel. For the higher labor rate, this added annual net income would be $38,400, about 1.54 per cent of a first cost of $2,500,000. For a labor rate the same as for mild steel, the added annual net income would be $46,400, or 1.85 per cent of the above cost. Thus, on a conservative basis, the substitution of high elastic steel as proposed should increase the earnings of such a tanker by not less than 1.5 per cent in each of the 20 years of its normal life. If the present annual net earnings are 10 per cent of the valuation, the substitution of high elastic steel would produce 15 per cent greater earnings.

"About 70 per cent of this addition to income may be attributed to the superior corrosion resistance expected and 30 per cent to the greater strength of the material."

Mr. Trask indicated that similar results could be shown in connection with ocean liners.

There are many other types of mobile structures which provide excellent opportunities for market expansion through the use of high tensiles in modern lightweight design. A few which have been tested in several years of service are: Mine cars, dump cars, trailers, tank trucks, buses, street cars, elevated and subway cars, tainter gates for river dams, pontoons, dredges, barges, portable bridges, etc. In all instances the economies effected are impressive and should cause a degree of obsolescence that will result in many profitable replacements.

Now, turning to the field of static structures, it is interesting to find that Great Britain, France, Germany, and India are more advanced in the use of high tensile steels for weight-saving purposes than is America. Report No. 501 of the Materials Committee of the German Iron and Steel Institute, June, 1940, said: "In bridge and building construction . . . they have been very conservative in America and still adhere to riveting. For this the engineer himself is responsible. . . . Although proposals for welding building structures appear here and there, no general application of welding for improvement of such structures takes place. . . . At the end of 1938 in the entire United States approximately three hundred building structures were welded, whereas in Europe the number of bridges alone of welded construction had reached eight hundred." . . . "It appears that the development of high strength steels has followed a different path in America from that in Europe. The German steels . . . were developed to meet the requirements of bridge and building construction, and from there, found their way into car construction."

The economies of the development, as they relate to static structures, are most promising, but less easy to set forth in general terms. A special analysis must usually be made of each individual project, and all cost factors carefully weighed to determine the manner in which the superior steels may be used to the greatest advantage. One of the chief considerations is the delivery cost of the components to the point of erection. These costs vary with the distance to be covered and the transportation facilities available.

Referring to the French paper, "La Revue Industrielle," May, 1935, the following is quoted: "The suspension bridge at Mananjary (Madagascar) would weigh 470 tons in ordinary steel. The use of chrome-copper steel (high tensile) reduced the weight to 335 tons, a saving of 28.7 per cent. Transportation of materials is very expensive, especially to the Colonies: Transportation to a French port, freight to a Colonial port, conveyance by Colonial railway, and sometimes by truck, etc. It is advantageous to reduce the weight, even if the steel costs more." Elsewhere the report said: "In the case of electric transmission towers the economy in weight realized by the use of high tensile steels is of great importance because the towers are installed in the country and some of them are located at distant and inaccessible points. Hence the decrease in weight reduces the installation cost greatly."

The author has a record of twenty-two of the many bridges built in various foreign countries of high tensile steels. Some of these were erected at home and some shipped to distant points. Ten of the number are of German manufacture and some were erected there, three were in China, two in Denmark, two in India, two in Africa, one in Sweden, one in France, and one in Australia. The saving in weight over ordinary steel ranged from 19 to 36 per cent. One of these, the Howrah-Calcutta Bridge, erected in India, employed 17,000 tons of "Tischrome," a chromium-copper high tensile steel manufactured by the Tata Iron & Steel Co.

THE steel framework of this skyscraper in Shanghai is a high strength German structural steel ST 52. The spires are about 270 ft. above street level. This building was erected by Dortmunder Union Construction Co.

An example of the use of high tensile steel in building construction is the Hongkong-Shanghai Bank, Shanghai, China, the tallest structure in Asia (if still standing), built by the Dortmunder Union Bridge Works of Germany, and erected in Shanghai. The saving in weight was approximately 18 per cent.

That these weight reductions represent substantial savings in erection costs, ocean freight, and other transportation charges, is obvious.

It is reasonable to assume that the American steel industry will wish to compete for such structures, to be erected in remote parts of the "new" world when the war is over and America's world-conscious engineers and future business men have returned to peace-time employment. This new incentive to broaden export markets should prove one of the tangible results of the globe-trotting necessities of this country's war effort. In view of the head start that foreign competition has gained in the use of better steels in improved static structures, rolled steel in the United States will need to muster every bit of its technical and commercial ingenuity if it is to obtain its proportionate share of the business offered. Ocean freights are likely to be a determining factor, especially in the markets of the East, and it is in these that the greatest promise seems to lie. To contemplate the possibilities in China alone causes one to take a deep breath.

The world is becoming "lightweight-minded" with startling rapidity. The trend was clear long before the war, and is now unmistakable. Maneuverability and speed, coupled with a high degree of stamina, are qualities demanded in structures for all mechanized warfare, on land and sea, amphibious, and in the air. War demands and the necessity of utilizing every material means to best satisfy them have been a powerful challenge to the ingenuity of chemists and engineers everywhere, and the success with which they are meeting the challenge promises something akin to a novel world when peace comes. These wartime "musts" have also resulted in the creation of capacities for scores of new materials on a scale that was beyond the comprehension of anyone only a short time ago.

It is wear and tear that creates recurring business. Obsolescence creates new business and new industries. New industries seldom create new business; instead they displace old industries, thus the motor car displaced the carriage—and the bus, the street car. What the impact of the aviation industry will be on all other forms of transportation is yet to be determined, but it is likely to be phenomenal.

There is only so much *real* wealth, consequently only so much depth to the average man's pocketbook. He can have more things, or a higher material standard of living, only when greater production and lower costs place them *within* the depth of his pocketbook. Inventive genius creates the new things which render the old obsolete. Enterprise and the profit motive put them into production, and the insatiable desire of man for everything new and shiny which he can afford creates the demand. The lowering of selling prices, or the cheapness with which industry can produce more things determines the velocity of the "turnover" in business. *This is precisely the objective and effect of the lightweight development in the structural world today.* The lightweight development, adopted as a program, would mean to the steel industry what improved and lower priced models mean perpetually to the automobile, radio, refrigerator, and a score of other industries. What it adds up to, in simple terms, is modern merchandising.

In the face of all this, the lightweight development hinged upon the so-called low alloy high tensile steels, demonstrated so successfully the world over for more than a decade, remains a drifting, haphazard movement within the rolled steel industry. It has now reached the age of ten and is still an orphan, not recognized as the industry's own fair-haired child. It would seem high time that the group of high tensile steels be adopted by the industry, and comprehensive plans for their post-war application formulated.

It is emphasized that steel's job No. 1 is winning the war; true, but job No. 2, preparation for the peace, begun now, is certainly its Siamese twin.

"Yet here, Laertes! abroad,
abroad, for shame!
The wind sits in the shoulder of
your sail."

Finishing Metals . . .

THERE are thousands of delicate filing operations that always have been and always will be done manually. There are also countless numbers of applications for jig filing or the method that reproduces the hand stroke mechanically. Continuous or band filing procedure, however, is the most productive in the long run due to the absence of non-productive return strokes. In other words, a file band actually cuts 60 sec. per min.

File bands were accepted as very promising and practical almost 40 years ago, but for some reason or other their general economy was not realized until a low-cost rigid band filer was developed. On the other hand, the introduction of specialized band sawing or contour sawing machines really revived band filing in this last decade. The war emergency has truly placed band filing machines in the high production metal working equipment bracket.

Contour sawing machines are readily converted to band filing. However, the regular band filing unit, being moderate in cost, is the best investment if conditions demand that the productive capacity of the contour sawing machine not be interrupted.

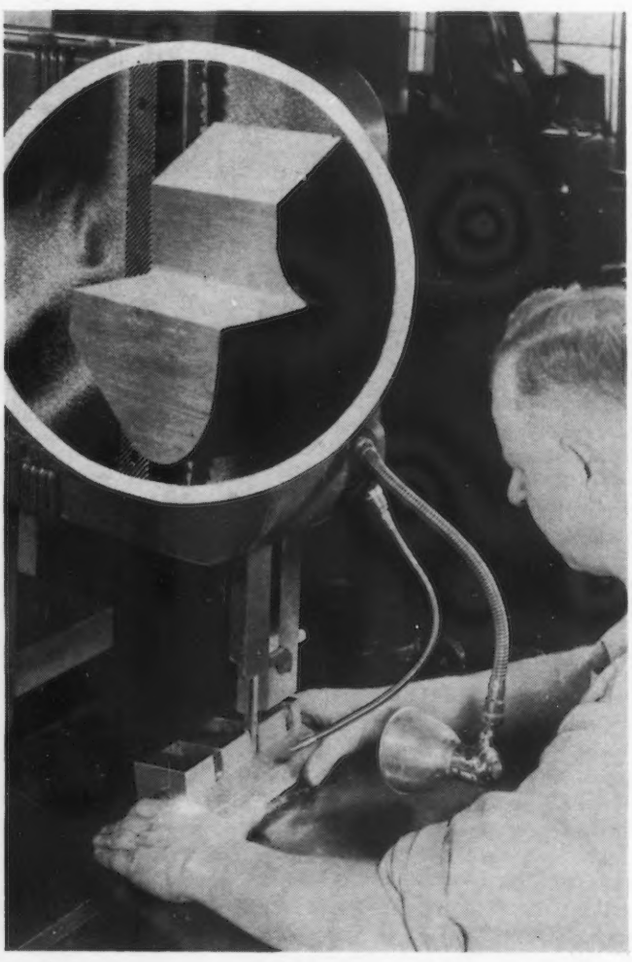
Modern file bands consist of a predetermined number of file segments 3 in. long mounted on a band of high grade spring steel having maximum strength and resiliency. File bands as produced today will not stretch, but the tension should nevertheless be removed when they are not in use.

File segments are manufactured in ¼, ⅜ and ½ in. widths. Twenty different styles simplify the matter of applying the proper technique. Flat, oval and half-round shapes permit choosing a file that will give the maximum cutting surface for the outline to be finished.

Average Life 100 Hr.

Since modern file bands have a cutting life of not less than 100 hr., they have to be a combination of scientifically selected material, expert workmanship, constant inspection and research. All the above requisities must be carried through from raw stock to finished product if a close degree of uniformity is to be maintained.

One should bear in mind that the teeth of a file band in action are quite similar to those of a saw band. A small chip curls before each of the tooth points and is dropped when clear



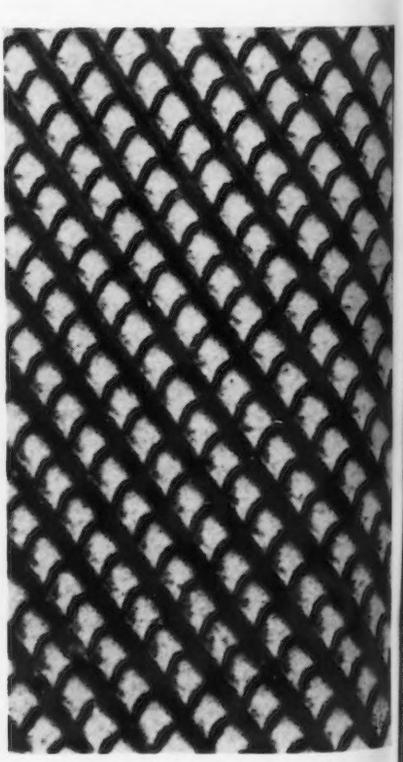
LEFT

FIG. 1—Finish band filing three openings in machine part to 0.001 in. perpendicular and spacing accuracy. (Insert) Close-up of three-dimensional band filing operation on formed tool, showing saw (right) and file used.

o o o

RIGHT

FIG. 2—Macrophotograph of medium cut bastard file segment.



By Band Filing . . .

By H. J. CHAMBERLAND
Continental Machines, Inc.

. . . Files of all types are as important to war production as drills, reamers, taps and milling cutters. Machine filing with band type files is putting this class of work more and more into production operations. The author brings this subject up to date and includes data on a new type of short angle file developed for non-ferrous materials.

of the work and the segment containing that particular tooth circles around for the next "bite".

A file band has such cutting properties that it will even "saw" if deemed necessary. A ¼-in. band, for instance, would leave a kerf four times wider than the average saw band, but this file band would produce 19 oz. of tool steel filings in 1 hr., or almost ten times that of a hand file.

Much the same as with a saw band, heat has a profound effect on a file band and also the surface being filed. Clean cutting is therefore essential because the heat produced by an efficient file even for a short period will surely destroy its remaining effectiveness. A heated surface soon becomes glazed and the material becomes impregnable to any heated, chip-crowded teeth of a finishing or fine-tooth file. On the other hand, a coarse or medium coarse will readily cut identical material with a minimum amount of heat being generated.

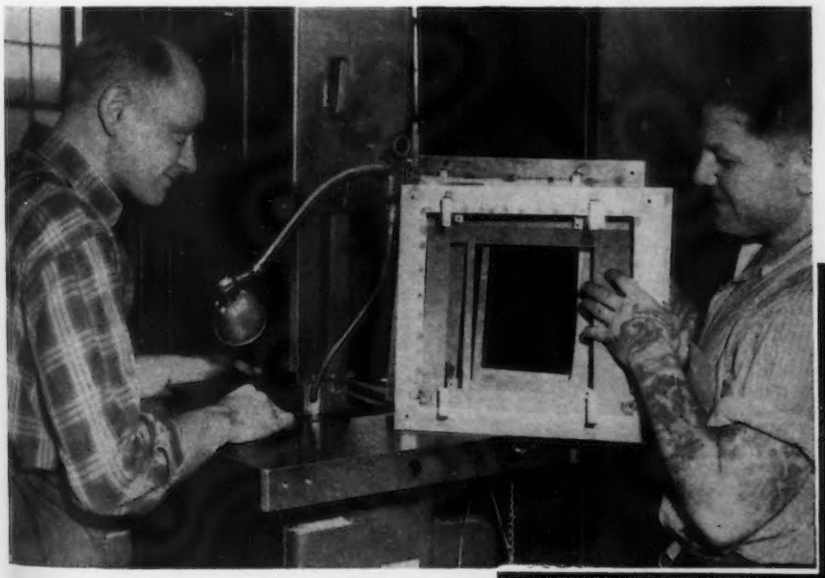
Excessive work pressure or feed has not the serious effects with band filing it has with band sawing. With band filing, any amount of pressure can be exerted, even to the point of stalling the band. This practice does not by any means mean faster filing. The correct pressure is one that will just about produce that "biting" effect. More pressure will impair cutting action and too little pressure is hard on the fine edges.

Three "Cuts" Available

File bands are available in three distinct "cuts" and each has a very definite purpose or application. The bastard cut file is the most commonly used since it is adapted for general use on all steels and most metals. This file is made with 12, 14, 16, 20, 24 and 34 teeth per in. As in the case of a saw, the spacing of teeth in a file determines its production rate and surface finish.

The coarse grades include files with 12, 14 and 16 teeth per in. A 12-tooth file is termed extra coarse, the 14-tooth is coarse and 16-tooth medium coarse. All three are recommended for general use on steel where cutting rate rather than finish is the chief objective. The 12-tooth bastard cut file also performs exceptionally well on cast iron.

The 16-tooth file is a good choice for a good finish on mild steel, a light pressure giving a still better finish. The 20-tooth file is best for a medium finish on tool steel. Also advisable for



ABOVE

FIG. 4—File bands are real production tools. In this case the former cost of producing these sheet metal parts has been reduced 40 per cent.

RIGHT

FIG. 3—View showing how band is rigidly supported for maximum filing feed.

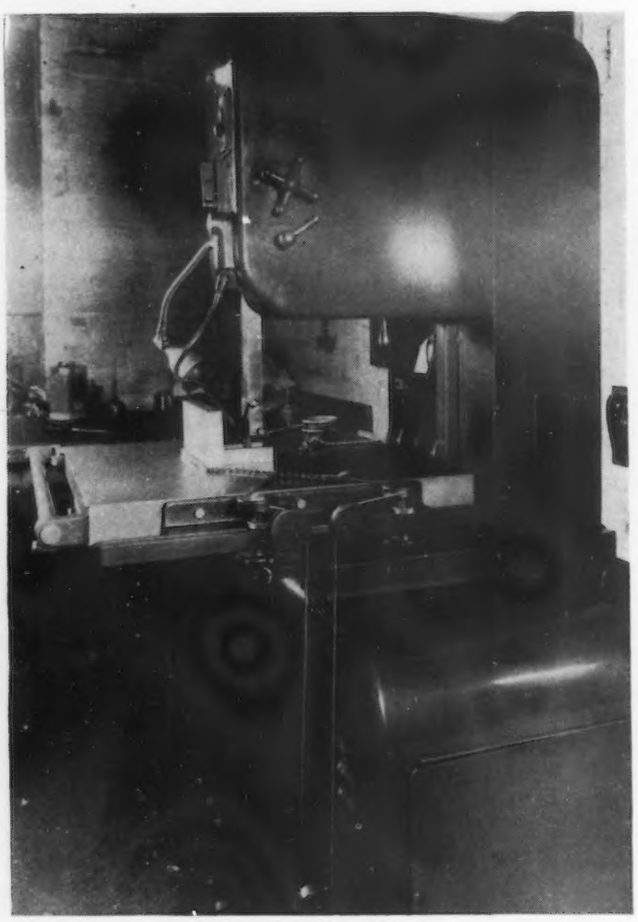
tool steel are the 24-tooth file for a semi-fine finish and the 34-tooth file for a fine finish. When a substantial amount of stock must be removed, a 14-tooth file for roughing and a 24 or 34-tooth file for finishing would be the most profitable choice.

Frequently used is the "mill cut" (not milled teeth) file. This file has 26 teeth per in. and is a finishing or semi-finishing file for all steels. The degree of finish depends on the pressure applied and the analysis of the material being cut.

The vixen cut is as important as the bastard because it was developed to file aluminum, brass, copper, zinc or any very ductile metal having the tendency to clog ordinary file teeth. The vixen file has large knifelike teeth milled across the face of the segment. It performs very well on cast iron and also non-metals.

The correct speed or velocity in each case has much to do in attaining maximum band filing efficiency. Incidentally, velocities for filing are much lower than for sawing. The following are general recommendations but are of course subject to a decrease or increase depending on individual conditions.

	Ft. per Min.
Cast iron	100-125
Cold rolled steel	80-100
High chrome-carbon steel	45-50
Brass and copper	100-125
Phosphor bronze and beryllium copper	80-90
Tool steels	50-60
Stainless steels	50-75
Nickel silver and Monel metal	75-100
Duraluminum-dural and aluminum alloys	100-125
Bakelite, builder's board and other non-metals	110-125



LEFT

FIG. 5—Automatic feed mechanism on a contour sawing machine proves most valuable for band filing. This is especially true for finishing medium weight or large parts.

Short Angle File

Recently there have been numerous requests from industrial plants for a fast-cutting production band file for cast iron, non-ferrous metals including aluminum, brass and copper, and most plastics. The qualities desired in such a file were that it be non-clogging, cut faster and leave a finish superior to that produced with the present coarse cut file and still entirely eliminate chatter.

After considerable research, the short angle file was developed. It is shown in an accompanying illustration. It is not an all-purpose file, however, as it is not intended to do finish filing as a whole, but it is fast cutting and will do a better job than coarse cut files usually used in connection with the materials mentioned above.

In comparison with other coarse files, the short angle file gives the following results:

Cast iron—Cuts 25 per cent faster and leaves superior finish free from chatter marks.

LEFT

FIG. 6—Faster cutting speed and superior finish are obtained with short angle files developed for work on cast iron, non-ferrous metals and most plastics

Copper—Cuts 50 per cent faster, finish is free from chatter marks and chips do not clog file as in the case of other course cut files.

Brass—Cuts 30 per cent faster, is very consistent in cutting speed and is non-clogging. Finish is good and entirely free from chatter marks.

Ampco bronze—Cuts 75 per cent faster, thus shows a great differential in cutting time irrespective of the toughness of this material. The fast cutting speed of the short angle file in this case is due to the self-cleaning property of the gullet which allows the tooth to form a full chip.

Aluminum—Cuts 40 per cent faster with identical non-clogging effects as with the cutting of Ampco bronze.

Plastic board—Cuts 30 per cent faster but leaves a finish similar to other coarse files since the latter do not clog with this material.

Production Experience with N. E. Steel

By R. W. ROUSCH
Chief Metallurgist, Timken-Detroit Axle Co., Detroit

. . . The author discusses the relative machinability of various NE steels and their action in shearing, carburizing and heat treating. The material presented herewith has been abstracted from a paper Mr. Rousch presented before the War Engineering Production meeting of the S.A.E. last January.

A GREAT deal of emphasis is placed today upon hardenability as a means of evaluating a steel. It is a rapid and convenient means of determining the hardening properties and a first indication of the possibilities of a steel, but to draw all of our conclusions on the basis of hardenability is neglecting the very important consideration of ductility. It is generally conceded that a steel will perform best if it can be fully hardened to its maximum hardness and then tempered back to the hardness desired. As tensile strength is closely proportional to hardness, it can be said that hardenability is a measure of strength, or rather the capacity for strength especially the strength of different portions across a cross-section. The elastic limit and endurance limit are proportional to hardness provided initial hardening was complete, but are not always proportional after incomplete initial hardening.

Elongation, reduction in area and impact properties show a definite relationship to hardness and strength in the lower hardness ranges, but in the as-quenched condition and in the high hardness ranges, this relationship does not always hold. There are a large number of parts, such as gears, which are used in these conditions. In this case, laboratory or performance tests on actual parts are the only safe and sure means of proving the value of a steel. The hardenability test has been a wonderful yardstick in building the NE steel specifications and was probably the only one suitable, but for the above reasons, the real value of a steel should be confirmed and verified by laboratory and performance tests. This is being done as rapidly as possible.

There are applications which do not require full, deep hardening. In face, some parts perform better if they do not harden throughout. In shafts and members subjected to torsional stress only, it has been found that a high surface hardness and lower center hardness gives the best torsional fatigue properties, also wear and shock resistance. Then there are a number of automotive parts being used today, which have never been fully hardened and yet are giving good performance.

With the commercial limits necessary in any alternate steel it is natural not to expect to match the hardenability of the original SAE steel exactly to a line. In the core hardness at any point in a gear, for instance, there has to be definite limits. It can be determined by performance testing that a given gear will be satisfactory with a core hardness range of say 10 points, Rockwell C. In specifications for hardenability, limits likewise have to be considered. Hence a hardenability band instead of a single line curve is established. One example of this is shown in Fig. 1, which is the hardenability band showing the limits required for NE 8744 steel for axle drive shafts (30 heats included). The curve outside the band represents a heat which would not give the required hardness if production shafts were shipped to other plants for hardening.

The first specifications for the NE steels to be published are shown in Table I. This covers the manganese-molybdenum, 8000 to 8500 series, and the chromium - nickel - molybdenum types, 8600 to 8900, inclusive. The carbon - molybdenum were designated as the 4000 series. Alternates for practically all of the alloy steels previously used were selected from this list.

These steels were ordered by manufacturers and tests made in production and in the laboratory. Some trouble was experienced with the manganese-molybdenum series in the low carbon carburizing grades. Core hardnesses were high and ductility and impact strength were low. Improvements in heat treatment, however, have made it possible to make good gears of NE 8024 and NE 8124 steels.

NE 8442 is an excellent steel. It has been used for studs, bolts and capscrews, both machined and cold headed, and when hardened to between 200 and 400 Brinell it shows excellent properties. Since the greatest shortages have occurred in molybdenum these steels have been practically eliminated, however.

By far the most popular of the NE steels have been the 8600 series and 8700 series. In the carburizing grades either type makes good gears. While there are only five points difference in molybdenum the NE 8700 series are probably better for heavy duty gears. The NE 8630 grade is used for a number of structural parts. It can be water quenched and with hardness between 200 and 400 Brinell shows good fatigue properties.

About the time the NE 8000 series were being well established and their use for important applications was showing a gradual growth, further shortage of the strategic alloying elements made necessary further reductions in order to insure uninterupted production of alloy steels. Shortages in molybdenum have become very serious, making it necessary to conserve on this alloy wherever possible. Watchful and careful checking of the scrap situation showed nickel-molybdenum series of steels, which could be made with little or no alloy additions.

The alloy contents in per cent were:

Chromium	0.20 - 0.40
Nickel	0.20 - 0.40
Molybdenum	0.08 - 0.15

By making experimental heats with these alloy contents, plus slight modifications in silicon and manganese, hardenabilities were found to compare favorably with those of all of the important alloy steels. This has led to the formation of a supplementary list of National Emergency Steel Specifications. The first of these is the NE 9400 series with very low alloy content. The next is the 9500 series, which is the same as the NE 8600 series with additional silicon and manganese. This series has high hardenability and is intended for heavy sections. As the chromium situation looked a little better, the NE 9600 series have been added. These steels have chromium, silicon and manganese as the principal alloying elements.

Within the last couple of months it has been necessary to alter some of these specifications on account of the alloy content of the available scrap. The percentage of nickel has been running higher than was anticipated and the limits for this element are being broadened to allow a wider range. Strange as it may seem, the percentage of nickel in the NE 8600 and NE 8700 series will be changed from 0.40 - 0.60 to 0.40 - 0.70 and in the 9400 series from 0.20 - 0.40 to 0.20 - 0.50.

The extremely critical condition in molybdenum has forced greater reductions in this element and the NE 8700 series except for NE 8720 is being deleted. NE 8817 and NE 8949 and also NE 8547 having high molybdenum contents have all been deleted, also NE 8339 and NE 8442. The latest list (as of Dec. 17, 1942) is shown in Table II.

Cold Shearing Bursts

From actual production experience with the NE steels there have been a few cases reported of flakes or bursts in large forging bars. This happens in the larger bar sizes and is especially prevalent in the steels of high hardenability. The condition is remedied by slow cooling in the mill after rolling. The writer encountered this only in one heat of NE 8720. This heat had to be scrapped as it cracked in cold shearing and could not be used for forgings.

In forging there has been no very great difference between the old SAE alloy steels and any of the NE steels.

Annealing and Normalizing

As it has been necessary for all manufacturers to use their available equipment for normalizing and annealing, there have been no great changes in cycles in changing to the NE steels. Most all of the steels respond to the cycles formerly used for the SAE alloy steels. The carburizing grades of the NE steels apparently require less time on cooling than some of the SAE grades. There have been some special short annealing cycles worked out and there will undoubtedly be more, which will show economies in time, fuel and machining, plus improved quality.

Machining

A number of manufacturers have reported no difference in machining between the NE steels and the former SAE steels. In some cases large lots have gone through production lines without the operators knowing there was a change in material. At Timken-Detroit Axle Co. over 100,000 spiral bevel rear axle drive gear sets have been made from NE 8720 steel. In the rough and finish cutting of these gear teeth, complete records were kept of the number of gears per cutter grind. Results in comparison to SAE 4620 and 4120 are shown in Table III.

Turning is done at 187 ft. per min. using a 0.010-in. feed and a 5/32-in. depth of cut. Brinell hardness is from 152-167, with an average of 162.

In hobbing splines at 400-444 Brin-

TABLE I

First Published Table of NE Steels

Designation	C	Mn	Mo	Ni	Cr
NE 8024	0.22/0.28	1.00/1.30	0.10/0.20	.....	.....
NE 8124	0.22/0.28	1.30/1.60	0.25/0.35	.....	.....
NE 8233	0.30/0.36	1.30/1.60	0.10/0.20	.....	.....
NE 8245	0.42/0.49	1.30/1.60	0.10/0.20	.....	.....
*NE 8339	0.35/0.42	1.30/1.60	0.20/0.30	.....	.....
*NE 8442	0.38/0.45	1.30/1.60	0.30/0.40	.....	.....
NE 8447	0.43/0.50	1.30/1.60	0.30/0.40	.....	.....
*NE 8547	0.43/0.50	1.30/1.60	0.40/0.60	.....	.....
NE 8620	0.18/0.23	0.70/0.95	0.15/0.25	0.40/0.60	0.40/0.60
NE 8630	0.27/0.33	0.70/0.95	0.15/0.25	0.40/0.60	0.40/0.60
*NE 8724	0.22/0.28	0.70/0.95	0.20/0.30	0.40/0.60	0.40/0.60
*NE 8739	0.35/0.42	0.75/1.00	0.20/0.30	0.40/0.60	0.40/0.60
*NE 8744	0.40/0.47	0.75/1.00	0.20/0.30	0.40/0.60	0.40/0.60
*NE 8749	0.45/0.52	0.75/1.00	0.20/0.30	0.40/0.60	0.40/0.60
*NE 8817	0.15/0.20	0.70/0.95	0.30/0.40	0.40/0.60	0.40/0.60
*NE 8949	0.45/0.52	1.00/1.30	0.30/0.40	0.40/0.60	0.40/0.60

NOTE: The following additional element specifications apply to all the basic open hearth steel shown above: Phosphorus 0.040% max.; Sulphur 0.040% max.; Silicon 0.20/0.35%.
*** Now deleted.**

nell, NE 8744 compared to SAE 3240 and 4340 at high hardness show the following pieces per grind of cutters in quantity production:

SAE 3240	SAE 4340	NE 8744
46	46	34
785	785	578

Cutter speed was 84 surface feet per min., depth of cut 5/32 in. and feed, 0.0057 in.

NE 8949 could not be machined with any success at this high hardness. At 375 to 430 Brinell it can be machined, but cutter life drops 80 per cent compared with cutters used on SAE 4340.

In the normalized condition these two steels NE 8744 and 8949 machine very favorably in comparison to SAE 3240 and 4340. Cutting speeds range from 178 ft. per min. with high speed steel tools, to 460 ft. per min. with carbide tools.

At hardnesses of 200 to 350 Brinnell, as regards machinability, NE 8630 is comparable to SAE 3130 and 4130; NE 8735 to 8740 are comparable to SAE 3135 and 4140, and NE 8740 to 8745, to SAE 3240 and 4340.

Carburizing Grades

There has been a considerable amount of work done on carburizing of the NE steels. In general, the NE steels, especially the more popular grades, 8620 and 8720, absorb slightly more carbon and show a higher carbon concentration on the surface. Carbon content, microstructure and hardness at various depths agree closely with SAE grades 4120, 4320 and 4620.

Some manufacturers are reluctant to use an NE steel as a substitute for some of the so-called high powered steels such as SAE 2512, 3312, etc. Timken-Detroit started out by substituting NE 8817 for these steels and from all indications it gave promises of good performance. Since it has been deleted, attempts are being made to substitute NE 8720. No doubt it will suffice for some applications, but whether or not it will meet all the requirements of SAE 2512 and 3312 remains to be seen. Some users have expressed the opinion that there should be an NE 8920. At least, it can be said that good judgment was used in retaining NE 8720 when all of the other 8700 steels were deleted.

Opinions are divided as to substituting NE 8720 for SAE 4820 although this is being worked successfully in a number of applications.

Parts made from NE 8620 and 8720 have been quenched direct from the carburizing temperature, cooled slowly and reheated for hardening and also double quenched. All treatments have been successful in their respective places. It has been found that a higher reheating temperature is required than was used for the same parts made of the SAE steels. It is our belief that these steels are at their best when direct quenched, especially for many heavy duty applications.

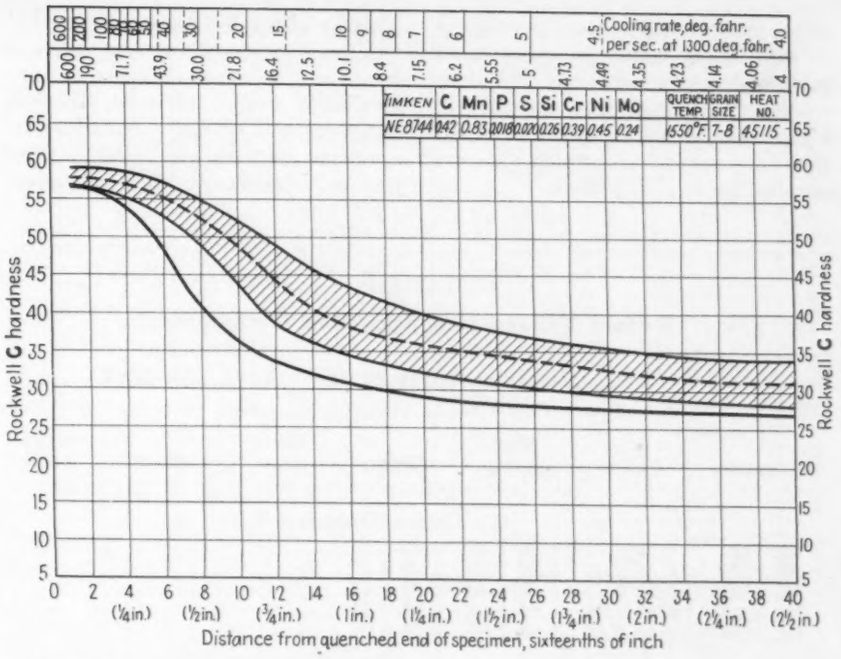


FIG. 1—In comparing steels by the Jominy end-quench method it is necessary to establish a hardenability band showing the limits of hardness at each point of the test bar. The NE 8744 steel shown would not be satisfactory for axle drive shafts since it falls outside the hardness band.

Distortion

Distortion in hardening of these steels is comparable to SAE 4620. Spiral bevel gears in our plant run 1½ to 2 per cent rejections for out of round and out of flat.

Carbon determinations of the case on NE 9420 carburized in gas and in compound show it to be equivalent to SAE 4620 and 4320 in this respect. Some manufacturers have reported NE 9420 acceptable for SAE 4120, but there has been much hesitancy in substituting it for NE 8620, NE 8720 or SAE 4620. A tremendous amount of work is in progress on this steel at the present time.

For structural steels, both oil and water hardening, a large tonnage of the 8600 and 8700 series has been used. In the manganese-molybdenum grades, NE 8339 and 8442 (now deleted from standard lists) have been used extensively. The use of NE 8442 for a number of parts is increasing. In the Brinell hardness range of 200 to 400, the available physical properties show that all of these steels are satisfactory. They have good strength and toughness. Fig. 2 shows physical properties of NE 9442 steel.

For studs, bolts and cap screws no trouble should be experienced with NE 9442.

NE 8630 has been substituted successfully for SAE 3130 and 4130. There has been considerable production experience on this steel for steering arms and knuckles and a limited number of fatigue tests at 300 Brinell hardness show that it is equivalent to the original steels.

NE 8744 has been used extensively for axle drive shafts in diameters up to 2¼ in. These shafts are quenched in oil from 1550 deg. F. and give a hardness of 500 to 550 Brinell. Tempering at 800 deg. gives a hardness of 400-444 Brinell.

Quantities of shafts have been made of NE 8949. They have deep hardening qualities and show reverse torsional endurance limits in excess of those for SAE 3240 and 4340.

Some trouble has been experienced in cracking of parts made of NE 8949. This grade is especially adapted to heavy sections and should not be used in parts where an NE 8700 steel will meet the hardenability requirements.

Addition Agents

No discussion dealing with steels, low in alloy, would be complete without considering the effects of special alloy addition agents. You have all heard the various names given to these steels, such as, Super Duper, Suped Up, Needled, Vitalized, Vitaminized, Intensified, a Shot in the Arm, Irish Stew, and many others.

Regardless of what may be thought or said, these steels are going to be in the picture because they do show results. With their high ductility at high hardness they have a combination of properties which is not equalled by any alloy steel.

After about four years of experience with a vanadium type additive treatment in the carburizing and structural grades of steel, showing unbelievable results, metallurgists could not sit back and think of it all just as a memory. Since vanadium has been restricted the use of these specially treated steels has been continued. Many different types have been tried. It is the writer's belief today that a proper alloy addition agent will give to the NE 9400 series the qualities which will make it a high grade steel. Recently, one heat of a modified NE 9420 steel with an additive treatment was made into spiral bevel rear axle drive gears. They passed our maximum requirements on the dynamometer test.

A very good report was received from a large automotive manufacturer on dynamometer tests of carburized and hardened transmission gears. The following information was given on the gears:

Circular pitch 5
Pressure angle.....20 deg.
Tooth width.....9/16 in.
Ratio .....15 to 25
Chamfer .....None

Gears were carburized, direct quenched and tempered at 380 to 400 deg. F. They were then shot blasted and tested at 1200 r.p.m. pinion speed. The number of cycles to cause failure at 100,000 lb. per sq. in. bending stress were:

Grade	*Cycles*
NE 9420 + Grainal*	819,000
NE 8620	472,900
NE 9420	204,100
NE 8142	109,100

*Addition agent of Vanadium Corp. of America.

When performance like this is shown repeatedly it is something that cannot be overlooked. Very capable committees are at work and testing programs are in progress. Now that the "go" signal has been given for these special alloy addition agents, greater developments can be expected.

Weldability

Considerable work has been done on different types of welding on a limited number of the NE steels. NE 8630 seems to be one of the best suited. It has replaced SAE 4130 in a number of applications. Aircraft tubing has been welded very successfully, both by oxy-acetylene gas flame and the metallic arc. The same general technique can be used for either steel. Using a mild steel rod, the maximum hardness reached in the heat affected zone is approximately the same for both steels. Warping and shrinking characteristics are similar, likewise the susceptibility to cracking. The tensile strength of welded joints, both as-welded and heat treated, are equivalent for both steels. Both fail in the same manner. While NE 8630 is the only NE ste

TABLE II

Revised National Emergency Steel Compositions

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT					
	Carbon	Manganese	Silicon	Chromium	Nickel	Molybdenum
Carbon Managanese Steels						
NE 1330	0.28/0.33	1.60/1.90	0.20/0.35	.....	.....	.....
NE 1335	0.33/0.38	1.60/1.90	0.20/0.35	.....	.....	.....
NE 1340	0.38/0.43	1.60/1.90	0.20/0.35	.....	.....	.....
NE 1345	0.43/0.48	1.60/1.90	0.20/0.35	.....	.....	.....
NE 1350	0.48/0.53	1.60/1.90	0.20/0.35	.....	.....	.....
Manganese Molybdenum Steels						
NE 8020	0.18/0.23	1.00/1.30	0.20/0.35	.....	.....	0.10/0.20
NE 8442*	0.40/0.45	1.30/1.60	0.20/0.35	.....	.....	0.30/0.40
Nickel-Chromium-Molybdenum Steels						
NE 8613	0.12/0.17	0.70/0.90	0.20/0.35	0.40/0.60	0.40/0.70	0.15/0.25
NE 8615	0.13/0.18	0.70/0.90	0.20/0.35	0.40/0.60	0.40/0.70	0.15/0.25
NE 8617	0.15/0.20	0.70/0.90	0.20/0.35	0.40/0.60	0.40/0.70	0.15/0.25
NE 8620	0.18/0.23	0.70/0.90	0.20/0.35	0.40/0.60	0.40/0.70	0.15/0.25
NE 8630	0.28/0.33	0.70/0.90	0.20/0.35	0.40/0.60	0.40/0.70	0.15/0.25
NE 8635	0.33/0.38	0.75/1.00	0.20/0.35	0.40/0.60	0.40/0.70	0.15/0.25
NE 8637	0.35/0.40	0.75/1.00	0.20/0.35	0.40/0.60	0.40/0.70	0.15/0.25
NE 8640	0.38/0.43	0.75/1.00	0.20/0.35	0.40/0.60	0.40/0.70	0.15/0.25
NE 8642	0.40/0.45	0.75/1.00	0.20/0.35	0.40/0.60	0.40/0.70	0.15/0.25
NE 8645	0.43/0.48	0.75/1.00	0.20/0.35	0.40/0.60	0.40/0.70	0.15/0.25
NE 8650	0.48/0.53	0.75/1.00	0.20/0.35	0.40/0.60	0.40/0.70	0.15/0.25
NE 8720	0.18/0.23	0.70/0.90	0.20/0.35	0.40/0.60	0.40/0.70	0.20/0.30
Silicon-Manganese and Silicon-Manganese-Chromium Steels						
NE 9255	0.50/0.60	0.70/0.95	1.80/2.20	.....	.....	.....
NE 9260	0.55/0.65	0.75/1.00	1.80/2.20	.....	.....	.....
NE 9262	0.55/0.65	0.75/1.00	1.80/2.20	0.20/0.40	.....	.....
Manganese-Silicon-Chromium-Nickel-Molybdenum Steels						
NE 9415	0.13/0.18	0.80/1.10	0.40/0.60	0.20/0.40	0.20/0.50	0.08/0.15
NE 9420	0.18/0.23	0.80/1.10	0.40/0.60	0.20/0.40	0.20/0.50	0.08/0.15
NE 9422	0.20/0.25	0.80/1.10	0.40/0.60	0.20/0.40	0.20/0.50	0.08/0.15
NE 9430	0.28/0.33	0.90/1.20	0.40/0.60	0.20/0.40	0.20/0.50	0.08/0.15
NE 9435	0.33/0.38	0.90/1.20	0.40/0.60	0.20/0.40	0.20/0.50	0.08/0.15
NE 9437	0.35/0.40	0.90/1.20	0.40/0.60	0.20/0.40	0.20/0.50	0.08/0.15
NE 9440	0.38/0.43	0.90/1.20	0.40/0.60	0.20/0.40	0.20/0.50	0.08/0.15
NE 9442	0.40/0.45	1.00/1.30	0.40/0.60	0.20/0.40	0.20/0.50	0.08/0.15
NE 9445	0.43/0.48	1.00/1.30	0.40/0.60	0.20/0.40	0.20/0.50	0.08/0.15
NE 9450	0.48/0.53	1.20/1.50	0.40/0.60	0.20/0.40	0.20/0.50	0.08/0.15
NE 9537*	0.35/0.40	1.20/1.50	0.40/0.60	0.40/0.60	0.40/0.70	0.15/0.25
NE 9540*	0.38/0.43	1.20/1.50	0.40/0.60	0.40/0.60	0.40/0.70	0.15/0.25
NE 9542*	0.40/0.45	1.20/1.50	0.40/0.60	0.40/0.60	0.40/0.70	0.15/0.25
NE 9550*	0.48/0.53	1.20/1.50	0.40/0.60	0.40/0.60	0.40/0.70	0.15/0.25
Manganese-Silicon-Chromium Steels						
NE 9630	0.28/0.33	1.20/1.50	0.40/0.60	0.40/0.60	.....	.....
NE 9635	0.33/0.38	1.20/1.50	0.40/0.60	0.40/0.60	.....	.....
NE 9637	0.35/0.40	1.20/1.50	0.40/0.60	0.40/0.60	.....	.....
NE 9640	0.38/0.43	1.20/1.50	0.40/0.60	0.40/0.60	.....	.....
NE 9642	0.40/0.45	1.30/1.60	0.40/0.60	0.40/0.60	.....	.....
NE 9645	0.43/0.48	1.30/1.60	0.40/0.60	0.40/0.60	.....	.....
NE 9650	0.48/0.53	1.30/1.60	0.40/0.60	0.40/0.60	.....	.....
Carbon-Chromium Steels						
NE 52100A	0.95/1.10	0.25/0.45	0.20/0.35	1.30/1.60	0.35 max.	0.08 max.
NE 52100B	0.95/1.10	0.25/0.45	0.20/0.35	0.90/1.15	0.35 max.	0.08 max.
NE 52100C	0.95/1.10	0.25/0.45	0.20/0.35	0.40/0.60	0.35 max.	0.08 max.

* Recommended for large sections only.

on which an appreciable amount of welding information is available, it is estimated that NE 9430 will show comparable results.

Summary

In summarizing the data available on the NE steels, it is necessary to proceed with caution. The number of tests reported to date is not large and the results cannot be taken as too conclusive. While it is all preliminary and subject to change, a start must be made sometime, so manufacturers will be helping the war effort by using the NE steels. It is our duty to make tests and improvements and apply these steels wherever possible and conserve strategic alloy.

In the gear steels NE 9420 is satisfactory as a substitute for SAE 4120 and probably for SAE 4620. It is not quite the equivalent of SAE 4320 or 4820. For most applications reported, NE 8720 has been satisfactory for the purpose. In the water hardening structural grades, NE 8630 can be substituted for SAE 3130 and 4130. Judging from physical properties it is reasonable to believe that NE 9430 will approach NE 8630. NE 9442 shows physical properties, including torsion, comparable to SAE 4140.

NE 8739 to 8749 have been very good substitutes for SAE 3135 and 4140 and their being deleted in favor of the NE 8600 series (meaning only a reduction of 0.05 per cent molybdenum) should not make a great deal of difference, but when alloys are reduced to the minimum, five points of molybdenum, it is good judgment to retain NE 8720 for gears and a number of carburized parts.

From the very small amount of data available on the NE 9600 series it appears to lack ductility. If such steels are used, they should be hardened between 200 and 400 Brinell. Careful and improved heat-treating practice will have to make up for some of the weaknesses.

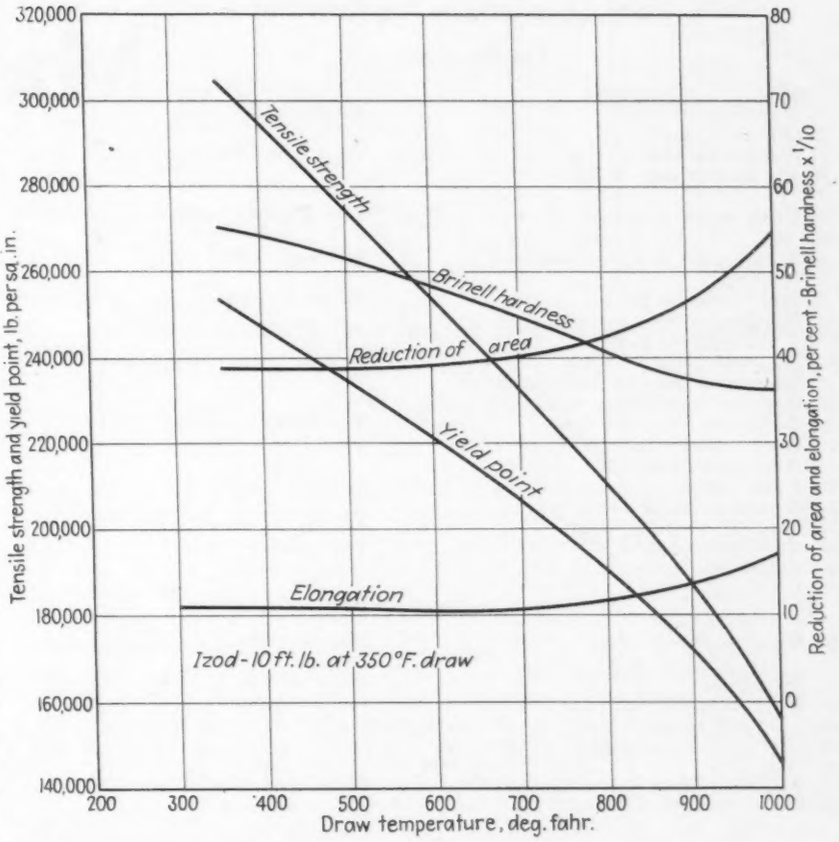


FIG. 2—Physical properties of NE 9442 steel normalized at 1600 deg. F. and quenched in oil from 1550 deg.

o o o

TABLE III

Machining Spiral Bevel Gears

Generating 1¾-In. Tooth Face in 28 Sec.

Steel	Gears per Cutter Grind		
	SAE 4620	SAE 4120	NE 8720
Roughing at 178 ft. per min.	90	90	90
Finishing at 157 ft. per min., 0.008 in. cut	50	40	40
	Formate 1¾ In. Tooth Face in 8 Sec.		
Roughing at 178 ft. per min.	200	190	190
Finishing at 157 ft. per min.	600	400	400

▲ ▲ ▲

Manufacture

Work Operations for Bayonet

Machine Room

Oper. No.	Description	Machine
1.	Grind edge of blade	Gardner disk grinder
2.	Size width (back)	" " "
3.	Profile lower edge of grip	Pratt & Whitney miller
4.	Mill face of grip—R side	" " " "
5.	" " " " —L "	" " " "
6.	Profile recess in grip—R	Leland Gifford profiler
7.	" " " " —L	" " "
8.	Roughing out elongated slots—Top	Bridgeport miller
9.	Finishing " " — "	" "
10.	Spot 5 holes for drilling	Buffalo drill press
11.	Drill 2 relief holes elongated slots	" " "
12.	" 2 holes for guard	" " "
13.	" center hole for catch	" " "
14.	Counterbore hole for scabbard catch	" " "
15.	Drill hole for scabbard catch	" " "
16.	Profile two elongated slots	Pratt-Whitney profiler
17.	Punch square relief hole, T-slot	Small Bliss press
18.	Finish square hole, T-slot	" " "
19.	Finish T-slots	Bridgeport miller
20.	Clearance cut for center hole	" "
21.	Rounding points on T-slot	Profiling machine
22.	File blade and finish	Bench work
23.	Inspection	

Grinding and Glazing Room

24.	Grind to size—R side	Heming grinder
25.	" " " —L side	" "
26.	Grind tang	Hand grinder
27.	Grind bevel—Bottom edge of blade—R side	Heming grinder
28.	" " " " " " —L side	" "
29.	" " —Top edge of blade—R side	" "
30.	" " " " " " —L side	" "
31.	Rough out blood groove—R side	Hand grinder
32.	" " " " —L side	" "

Hardening Room

33.	Stamp blade	Martin stamping machine
34.	String before hardening	
35.	Harden	
36.	Straighten after hardening	
37.	Wash	
38.	Temper blade	
39.	Straighten blade after tempering	
40.	Inspect	

Glazing Room

41.	Grind oval part	Glue bonded abrasive wheels
42.	" shoulders	" " " "
43.	Glaze sides of blade	" " " "
44.	" bevel of blade—R side	" " " "
45.	" " " " —L side	" " " "
46.	" Oval part of blade—R	" " " "
47.	" " " " " —L	" " " "
48.	" edges of blade	" " " "
49.	" back of blade	" " " "
50.	" " " pommel	" " " "
51.	" inside of pommel	" " " "

Guard Assembly Room

52.	Press guard on blade	Hand press
53.	Reaming rivet holes in blade	
54.	Pins in guard	
55.	Rivet guard on blade	
56.	Grind rivets on guard	Small grinder
57.	Burring guards after grinding	" "
58.	Test and inspect blade	
59.	Sandblast	
60.	Parkerize	

Assembly Operation	Stock Room
61. Scabbard & bayonet catch assemble	66. Make up spare parts in envelopes
62. Assembly right grip and screw	
63. " left " " tighten screw	
64. Check alinement with gage	
65. Check scabbard with gage	

Shipping Room

67. Assembly, shipping cases	69. Fasten top to shipping cases
68. Oil & pack bayonets & spares in cases	70. Mark cases to destination

THE idea of the bayonet was born of desperation in the minds of some hard pressed French peasants who had run out of ammunition while fighting bandits. They thrust their knives into the muzzles of their guns and carried the fight to a successful conclusion. Following up this idea the French designed a plug bayonet, a knife with a cone shaped handle, that could be thrust into a musket after it had been fired. These knives were known as Bayonnettes, after the village of Bayonne, and were developed in the 1640's. Of course, the gun could not be fired with one of these in it, but loading was a tedious process in those days.

The socket bayonet was a later development and it is said that an English regiment was confounded by charging French infantry who fired with fixed bayonets. This was in the reign of William III. Pointed iron rods, flat, round and triangular have been employed as well as knife blades. In America a triangular shaped bayonet was used until 1892 when the Ordnance Department of the U. S. Army brought out the knife type. With some refinements the bayonet of today is essentially the same as the first one.

The world's largest cutlery plant, which changed hands and location just before the war has converted a large portion of its facilities to the manufacture of the Army bayonet. The plant is now operated as the cutlery division of the Pal Blade Co. While the bayonet looks simple, in reality there are eight parts and these are made in four different plants. First of these is the knife blade and handle (all in one piece). Then there is the two handle grips, the guard, the bayonet catch, the scabbard catch, the scabbard spring and the grip screw, Fig. 1. The knife blade and handle are forged from ⅞ in. square stock in a nearby and well-known forging plant. Formerly a high alloy steel (SAE 5090) was employed but owing to the critical nature of the alloying metals the Ordnance Department redesigned it so that a high carbon steel (SAE 1080) could be used.

# of Bayonets . . .

By J. B. NEALEY
Ordnance Department, U. S. Army

. . . How the world's largest cutlery plant turns out the standard U. S. Army bayonet on equipment that in some instances dates back to the Civil War.

The bayonets are forged from bars, until the bars are used up. Heating is accomplished in slot type furnaces some 8 x 4 x 6 ft. high fired from the rear with oil burners. The stock is heated to 2200 deg. F., and forging is done on a single heat. Board drop hammers of 2500 lb. rating are used with three impression dies and only about nine blows per bayonet are required. The flash is cut off in a trimming hammer.

As these forgings must be dead soft for machining they are pack annealed and subjected to a heating cycle requiring about 20 hr. First they are brought up to 1425 deg. F. which requires 8 hr.; they are held at this temperature for 3 hr., and then the heat is dropped 50 deg. per hour until it is down to 1300 deg. F. At that point the burners are cut off and the work is allowed to cool in the furnace. For this heat treatment, the forgings are packed with cast iron borings in cast iron boxes, sealed, and put into a semi-muffle, oven type furnace about 8 ft. square and 6 ft. high. Heat is supplied by two gas burners firing from opposite sides.

The forgings are then shipped to the cutlery plant already mentioned. It has done a remarkable job of rebuilding antiquated machines to do the required machining. Some of the machines were 50 to 75 years old but due to the shortage of machines they had to be rebuilt for the work in hand. Plant conversion was accomplished under the direction of the Pal Blade Co. engineers and staff who laid out production lines and trained the necessary help. One of the features of this plant is the large number of women employed, about 70 per cent of the working force. The intention is to use them wherever possible and about the only place where it does not seem feasible to employ them is in the grinding and glazing department. Here the operator sits on a low stool and must lean over to hold the work against the under side of a polishing wheel. For routing from one operation to another the bayonets are laid in flat wooden boxes, 20 to a box.

The accompanying table shows the complete list of operations. The first two operations in the machine shop are simply to true up the front and back of the bayonet blade. This is accomplished on a disk grinder (30 in. in diameter) with a motor driven carriage and fixture that holds the work at the correct interval and moves it across the face of the grinding wheel, Fig. 2. A Pratt & Whitney profiler of ancient vintage is employed in profiling the lower edge of the grip or handle while a Lincoln type miller (P & W) is used to mill both faces of the grip, Fig. 3. The recess in the grip is profiled on either a Leland Gifford or a Putman and the elongated slots on the top are both roughed and

FIG. 2—First operations after forging are grinding the edge of the blade and sizing the width. This is done on Gardner disk grinders with special fixtures.

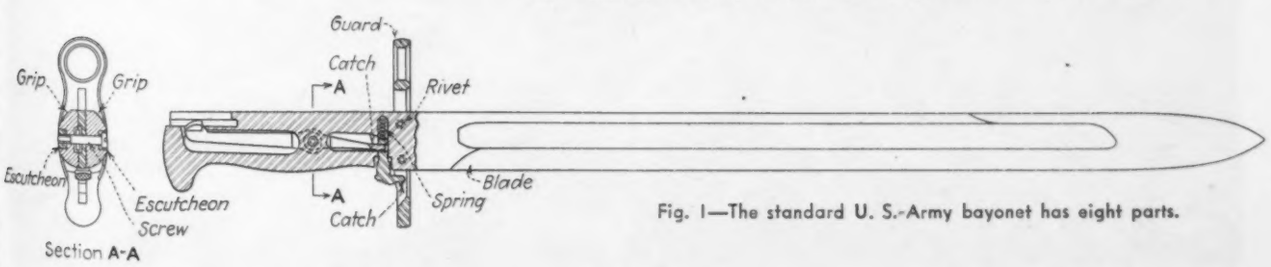


Fig. 1—The standard U. S. Army bayonet has eight parts.

finished on a Bridgeport vertical miller, Fig. 4. A small Buffalo drill press is used to drill the various holes in the grip, Fig. 5, while the two elongated slots are profiled with a Pratt & Whitney.

The forming of the T-slot is started by punching a square relief hole in a small Bliss press and the slot is then finished in a Bridgeport miller. The same type of miller is used for the clearance cut for the center hole while the points of the T-slot are rounded on a profiler. The original fixture on the press proved unreliable so a new fixture was built with better holding points so that the hole could be punched exactly to tolerance.

Operations in the grinding and glazing rooms are mostly done by hand although several grinders of the Heming and Gardner types with motor driven carriages and holding fixtures are employed. Truing, bevel and flat face grinding can be done on the machines but the ovals near the point of the blade, blood grooves, etc., are formed with the aid of the hand grinders, Fig. 6. These are also employed in shaping parts of the grip or handle such as the pommel or lower rear section and the long contour.

The blade proper is hardened in a salt bath, Fig. 7, at from 1550 to

UPPER LEFT

FIG. 3—A group of old machines used for profiling (right) and milling (left).

CENTER

FIG. 4—Battery of Bridgeport vertical millers for roughing and finishing the slots on the top with end mills.

BELOW

FIG. 5—Spotting, drilling and counterboring operations on the grip are performed on these Buffalo bench drillers.

FIG. 6—Ovals near the point of the blade, blood grooves, etc., are ground by hand on this battery of glue bonded wheels.

1580 deg. F. A furnace 4 ft. sq. by 3 ft. high holds the pot and heat is supplied by a single gas burner. The gas is dropped to atmospheric pressure and is inspirated with 20 oz. of air pressure. An automatic temperature control with a two position valve in the air line maintains the temperature. Six minutes in the bath brings the blade up to temperature and it is then quenched in oil. During heating and quenching a fixture is used which holds 12 bayonets in suspension. When placed over the furnace only the blades are submerged. The oil in the quench is cooled by pumping through another tank equipped with cold water coils. This tank also has baffles over which the oil is forced thus dropping out most of the salt accumulated from the blades. There is an inspection at this point and blades distorted in the quench are straightened by bending them over a wooden half circle.

The blades are then drawn at 425-450 deg. F. for half an hour in the same type of furnace and bath. Here the bayonets are handled in baskets of 200 each by a chain hoist suspended from an overhead rail. They are cooled in water. Bayonet and scabbard catches are carburized in cyanide baths in similar type furnaces at 1500 deg. F. for 1 min. and 1400 to 1450 deg. F. for 7 min. respectively. After tempering, some of the blades need straightening and are laid on a hot gas plate for warming. All the blades are given an 18-deg. bend test at this point.

Back in the glazing department the

FIG. 7—For hardening, the blades are heated in a salt bath for 6 min. and then quenched in oil. Drawing is also done in salt baths.

FIG. 8—Government inspection of blades. The alinement and scabbard fit is checked with a form gage.

blades are finish ground and the bayonets are then sent to the assembly lines. The guards, catches, springs and screws, all of steel, are made at another factory of this company. The two handle grips are made of a plastic material at still another plant. First off a hand press is used to press the guard onto the tang of the bayonet, the rivet holes are reamed, the guard is riveted to the blade by a small riveting machine and the rivets are then ground and burred. After testing and inspecting the blades are shotblasted, a cabinet with a glass window, arm holes and rubber sleeves being used. Some 50 bayonets are piled in one side and the operator, through the arm holes and protected by the sleeves, holds them one at a time under the blast. Finally they are Parkerized for ¾ hr. at 210 deg. F., rinsed in cold water, immersed in a chromic acid solution, dried in an air blast and dipped in mineral oil.

Assembly is now completed by putting in the catches and spring, and screwing on the two plastic halves of the grip. Inspection, Fig. 8, and packing follow.

o o o

Training Program Aid for Industry

By J. H. GREENLAND
Training Specialist, Cleveland District Training Within Industry

o o o

INDUSTRY'S old methods of training now take far too much time; nor is there time for each plant to use the trial and error method of improving its training program. To aid industry in converting non-defense workers to war work, and in training approximately five million women, the government has created an agency called Training Within Industry. Its training specialists will outline a plant program, incorporating the services of other government agencies capable of handling the training needs of the plant. It is possible to have a member of the T.W.I. staff visit your plant and make a complete survey of training needs, without charge. The plant, of course, is not committed to acceptance of the suggested plan.

Prospective supervisory material also needs training, and the supervisors already in the saddle frequently need rejuvenating. Manpower was plentiful during the depression, so little effort was expended in training supervisors and understudies who could be upgraded, if needed. Then, as experienced supervisors and highly skilled mechanics began to move, industry began the practice of pirating help, which is at best a temporary solution to the personnel needs of a company; the best way is to upgrade and train supervisors.

T.W.I. has a short 10-hr. course given in five, 2-hr. sessions called Job Instructor Training. Reports from companies show a marked improvement in production the week following the completion of the sessions. The list of industries covered by this branch of T.W.I. includes steel mills, ordnance, foundries, electrical, food, woodworking and machine shops. More than 200,000 supervisors from president to leadmen, have had this training.

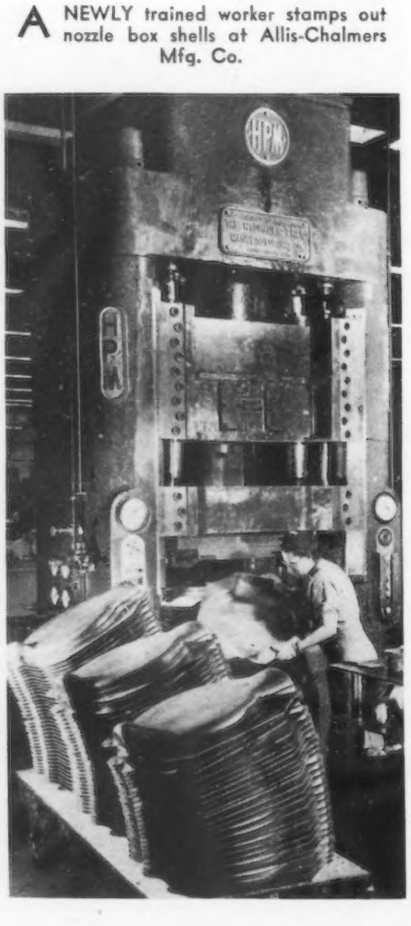
Here are some problems that Job Instructor Training has helped solve in war production plants.

Production Problems

- Men don't know their jobs
- Poor planning
- Deliveries delayed because of errors and mistakes by men making the parts
- Men have difficulty in reaching production

o o o

A NEWLY trained worker stamps out nozzle box shells at Allis-Chalmers Mfg. Co.



Safety Problems

- Safety equipment not properly used
- Men don't know the hazards of their job
- Men get careless
- Poor shop housekeeping

Quality Problems

- Meeting inspection standards
- Too much scrap and re-work
- Jigs and fixtures not properly used
- Too much left to operator's judgment

Personnel Problems

- Men leave—can't "get the hang" of the job
- New men lack experience in mechanical things
- Lack interest in work
- Too much time to reach production
- Can't get experienced men
- Need of an in-plant training program
- Need of on-the-job training program
- Need of a supervisory training program
- Need of an induction program
- Need of an upgrading program
- Need of a labor relations program
- Conversion to women workers

Training Within Industry is staffed with men from industry. Training Specialists who can offer expert advice on training programs, conversion of jobs to female labor, in-plant, on-the-job or vestibule training, upgrading, supervisory training and job relations programs are available for the asking. To date, the record set by T.W.I. as a helpful agency, without cost to industry, is truly phenomenal. Such feats as converting a 100 per cent male worker plant over to a 60 per cent women worker plant, or reducing training time from an original eight weeks to one week, are becoming commonplace.

Electro-Brazing With Water-Cooled Tongs

By G. E. PRUSSIEN
General Electric Co., Schenectady

° ° °

As a result of the shortage of tin for soldering, General Electric Co., Schenectady, is now using the incandescent carbon process of silver brazing of copper to copper joints. The equipment for this process is usually in the form of a press welder. However, for portable application, General Electric has developed a pair of water-cooled tongs, Fig. 1, built up from a pair of 8 in. parallel flat nose pliers.

For general application, a.c. is used as there is no simple method of obtaining d.c. in the amperage required. At Schenectady, the normal current supply is obtained through brazing transformers having 220 volt primary and variable 8-10-12 volt secondary. These transformers have a rated capacity of 10 and 20 kva. and can be overloaded up to 100 per cent for short intervals of time. The primary load varies from 45 to 90 amp. depending upon the size of the carbons and thickness of the work.

Primary leads up to 50 ft. in length are used so that the transformer may be moved from job to job. Water supply and return lines are run to the transformer to be attached to the water-cooled leads at the secondary terminals. Power is controlled through a foot-operated switch to a contactor panel with 100 volts control.

Fifteen different grades of carbons are used. The grade of carbon varies with the size and type of the work to be brazed. The most universally used carbon is the soft or Grade D carbon having a resistance of 0.007 ohms per cu. in. However, on very fine work a much softer carbon is used and on heavier work or for rapid heating, carbon having a resistance as high as 0.015 ohms is used. The carbons are made up in various sizes to conform to the work to be brazed and the heat required.

Silver alloys having a content of 15 per cent silver, 80 per cent copper and 5 per cent phosphorus meet present requirements as no flux is needed. This alloy melts at 1200 deg. F. and flows freely at 1300 deg. These alloys are ordered cut to strip sizes varying in width with the brazing to be done.

The tongs, which are used as carbon holders, are made by first welding steel blocks onto the plier jaws to give them an outside width of 1½ in. when closed. The blocks are then drilled and tapped for ⅜ in. bolts. Bar copper of varying dimensions is bent to fit the clearances required for the particular job to be handled, and the tips are cut to hold small blocks of carbon. The bars are drilled and tapped to accommodate ¼ in. pipe fittings by means of which water-cooled power leads are attached. A rubber hose jumper forms a water connection between the jaws, and additional water carriers may be drilled the entire length of the bars if necessary. Mica sheets and bushings are used for insulation between parts and pliers.

A single-loop pronged spring of 0.019 in. size, welded at one end and free at the other between the handles of the pliers, provides sufficient force to open the jaws when the braze is completed.

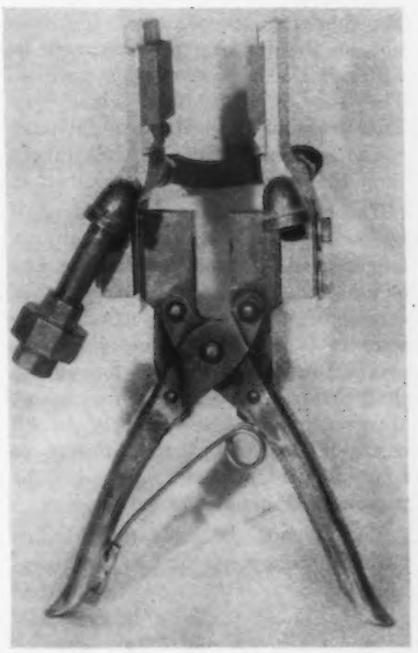
The following is a typical silver solder joint for which one of the plier type brazing tongs was developed:

Copper strips ¼ in. thick by 3 in. wide are brazed to copper bars 1 in. thick by 1½ in. wide, Fig. 2. The strips and bars, which have been assembled in the stator frame, are loaded with silver strips, clamped together and brazed. The difficulty encountered was the ¾ in. clearance between connections, but was solved by using thin carbons on the tongs. A carbon 2 x 1½ x 5/16 in. of the high resistance or hard type was used for this braze.

The current was drawn from the 10 volt tap on a 20 kva. brazing transformer, using continuous power for 1 min. to bring the copper to a cherry red heat, thus completing the bond. Additional silver may be flowed to fill the joint for appearance. A brazed joint of about 3 sq. in. results from this application.

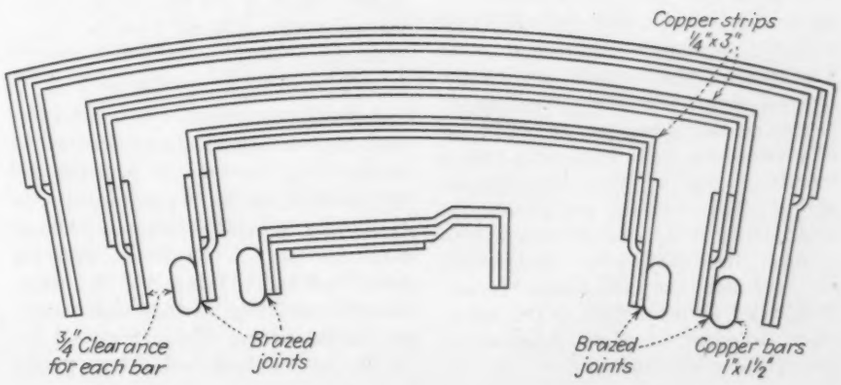
RIGHT

FIG. 1—These water-cooled brazing tongs have been built up from a pair of 8 in. parallel flat nose pliers.



BELOW

FIG. 2—A typical silver solder joint for which one of the plier type brazing tongs was developed. Because of the ¾ in. clearance between connections, thin carbons were used on the tongs.



Accelerated Fatigue Tests

THE problem of providing substitute materials for products which have been in use for a long period of time and giving satisfactory service, but requiring materials that have become scarce or even forbidden has become of primary importance to all manufacturing industries. The problem must be met by the engineer, the purchasing agent and by the production man as it is not only a question of design, but availability and manufacturing complications.

Substitutions can be made by simply changing the material specification on the drawing and releasing it, which is the most dangerous method. The service difficulties which can arise from such a method might later present a real problem—much larger than the original one of substitution.

The thorough method, of course, is by the process of elimination through long periods of testing, redesign and exhaustive research, which when completed, may produce a substitute that is just as satisfactory as the original or may even give longer life than the original design. This method, however, cannot be employed in all cases on account of the amount of time required, particularly in the present emergency.

Throughout the industry, it has been the policy not to sacrifice durability of items involving safety. When substitution of material became necessary for forgings in steering knuckles, steering arms and other axle and steering parts, exhaustive tests were made to obtain equally as good or better life with the substitute material so that no failure of parts was invited which would involve the lives of men. The same was true of brake parts. Changes in radii or fillets on some parts applied in such a manner as not to affect interchangeability often made the substitute steel satisfactory where substitution alone without modification of design did not produce an acceptable result. This could be attributed to the somewhat different physical characteristics of the substitute steel.

In making substitutions for a critical alloy steel used in a "safety item," such as a steering knuckle, a base line must first be established for future comparisons. Up to the time of mass substitutions, the principal way of testing for such items was road testing. A standard road test over a fixed durability schedule on our proving ground consisted of 20,000 miles with frequent periodic inspections. When the test was repeated on several vehicles and final inspection revealed no questionable characteristics, the item was released for production.

It is obvious that such a complicated and time-consuming procedure could not be used repeatedly for the judging of substitute materials. However, it would be possible to take advantage of past field experience with these safety items. They had been in service for a number of years and their record of performance was established. It was then a simple step to set up in the laboratory an accelerated test which would cause a failure of the part in a comparatively short time using normal loads but applying them and releasing them much more frequently than they would normally be in service. This is the basis for the "stroking test." This is a test in which a measured load can be applied and released on a component.

Stroking Test Devised

After establishing definite cycles to failure on this stroking test, material comparisons can be made quickly and if the results of the test on a particular substitute are as good or better than the production material, then it is safe to use it in production.

A good example of Chevrolet laboratory procedure and the amount of engineering involved is brought out by the long series of tests conducted to obtain a satisfactory substitute steel for a 1½-ton truck steering knuckle. The knuckle with the spindle pointed vertically upward was mounted to an anchor block fastened securely to the floor bed plate. A pin representing the king pin was driven through the king pin hole of the steering knuckle and through alining holes which had been drilled in the anchor block, and cap screws were placed in the knuckle apron mounting holes to prevent it from tipping on the pin. A front wheel hub with bearings was installed on the spindle. A loading arm of 15.92 in. effective length (equal to rolling radius of 1½-ton stake truck) was bolted at one end of the hub at the wheel bolt holes, and the other end was connected to a spring saddle attached to a stroking machine piston. The load applied was measured by the deflection of a ring built into the piston rod.

Various trial stroking loads were used in preliminary tests on production steering knuckles obtained from stock. For these preliminary tests the load was successively decreased until failure was produced with a minimum of 100,000 cycles at 260 cycles per min., each cycle being the application of the load first downward and then upward from the horizontal position of the loading arm. From these checks a load of 783 lb. (representing a front wheel weight of 1305 lb. times 0.6 coefficient of friction) was selected. Several samples of each type steel were stroked until failure to obtain low, high and average values for fatigue lives. The following results were obtained on the original steering knuckle:

Test No. 1

Material	No. of Cycles to Failure
SAE X3140 (Ni-Cr)	
[Consistency (High:Low) ratio 1.88:1]	
	128,000 low
	241,000 high
	159,000
	176,000 avg.

Test No. 1 established a laboratory base line on production material which had proven satisfactory in field service. Therefore 128,000 cycles to failure was taken as the absolute minimum acceptable. The ratio of the low and high fatigue lives was used as a means of measuring the consis-

on NE Steels

By JOHN G. WOOD
and
R. F. SANDERS
Assistant Chief Engineer and Engineer in Charge of Material Analysis Respectively, Chevrolet Division of General Motors Corp.

Laboratory Tests have been devised to give quick answers as to the suitability of certain NE steel substitutes for vital "safety" parts of automotive vehicles. Slight modifications in design and the use of shot blasting have been found to make up for any deficiencies in fatigue life of components. The data presented herewith have been abstracted from a paper the authors presented on Jan. 13 before the War Engineering Production meeting of the Society of Automotive Engineers.

tency of the material. The ideal ratio would, of course, be 1:1.

A second test was made on a molybdenum type of steel with the following results:

Test No. 2

Material	No. of Cycles to Failure
SAE C4140 (moly) 1st substitute (consistency ratio 1.93:1)	188,870 low
	365,000 high
	230,000
	261,290 avg.

Test No. 2 showed C4140 to be a satisfactory substitute for X3140 and was released for production. However, the supply of C4140 was not adequate to meet our demands and accordingly it was necessary to develop another substitute. The first substitute was MG No. 10 manganese Grainal* treatel steel.

**Trade name applied to a series of addition agents made by Vanadium Corp. of America.*

Test No. 3 proved this material to be unsatisfactory when comparing the low, high or average data with Test No. 1. The fatigue test results were as follows:

Test No. 3

Material	No. of Cycles to Failure
MG No. 10 manganese Grainal treated (consistency ratio 1.65:1)	114,920 low
	189,600 high
	187,000
	128,637
	155,039 avg.

Other fatigue tests showed MG No. 10 Grainal treated steel to be satisfactory from the fatigue point of view, but later tests of this material were not so encouraging due to poor hardening characteristics and it was not felt advisable to use it even though this fourth fatigue test showed good results. Besides, the supply of this material soon vanished. A related Grainal treated steel was then tested with the following results:

Material	No. of Cycles to Failure
MG No. 1 Grainal treated steel (consistency ratio 5.77:1)	91,411 low
	526,650 high
	371,190
	517,287
	376,635 avg.

This test showed such a wide spread between high and low fatigue life values that the average showed a distorted picture. Note the extreme high-low ratio. This material was not considered satisfactory in view of the one low value. Considerable experience in observing the location and nature of the cracks had been obtained by now and accordingly it was decided to increase the size of several fillets and various radii to relieve localized points of stress. Therefore this same material was tested having a larger radius at the flange plate pilot, with the following results:

Material	No. of Cycles to Failure
MG No. 1 Grainal treated steel (consistency ratio 3.19:1)	190,076 low
	606,897 high
	365,991
	339,000
	375,491 avg.

This test showed a considerable improvement, particularly in the lowest value. It should also be noted that the results in this test are approximately 213 per cent of those obtained on the original material in Test No. 1.

Another series of tests were then made on a steering knuckle on which an increased radius as well as collar was added at the flange plate pilot. The quality of machining was also improved at these points. The test results were as follows:

Material	No. of Cycles to Failure
MG No. 1 Grainal treated steel (consistency ratio 1.87:1)	231,679 low
	432,050 high
	416,650
	305,460
	346,460 avg.

Although the average figure was no better than obtained in the two previous tests, the spread between the high and low was considerably less and what was considered more important was the fact that the low figure was by far the best one obtained up to this time. Note that the high-low ratio is approximately the same as obtained in Test No. 1 on production material. The design changes were maintained in all future tests.

At this point in the program, many tests were made from sample production runs, comparing hard and soft parts. Experiments were also made with water and oil quenching. Tests showed practically no difference between knuckles that were quenched in oil and those quenched in water.

Since the supply of MG No. 1 steel was not to be depended upon, it became necessary to get a satisfactory National Emergency steel, so the program was continued in that direction, first with NE 8447, with the following results:

Material	No. of Cycles to Failure
NE 8447 (no nickel or chromium) (consistency ratio 4.71:1)	147,659 low
	695,000 high
	389,123
	376,550
	267,593
	217,000
	348,821 avg.

Although the NE 8447 steel showed a wide spread between low and high values, this spread as well as the average value were higher than the original SAE X3140 (nickel chrome) material in Test No. 1, and was satisfactory. No metallurgical irregularity could be found to account for the wide spread in fatigue lives of this material.

To further the study of NE steels, samples of NE 8744 were obtained, containing 0.50 per cent of nickel and chromium. These gave the following cycles to failure:

Material	No. of Cycles to Failure
NE 8744	124,400 low
	416,561 high
	307,000
(consistency ratio 3.34:1)	224,517
	198,738
	169,292
	373,000
	142,906
	244,552 avg.

Although the average and high values of the NE 8744 steel were better than those obtained with the original production SAE X3140 material, the low value was under that shown in Test No. 1 (128,000 cycles).

This material might have proved satisfactory in production but we felt that it was borderline and in the attempt to improve it, we obtained samples of NE 8744 knuckles that were shot blasted at all areas subject to stress concentrations. Fatigue lives of the shot blasted material were far greater than any of the materials tested and showed that a great benefit is derived from this operation, thus:

Material	No. of Cycles to Failure
NE 8744 shot blasted	639,000 low
(consistency ratio 2.56:1)	1,636,980 high
	1,162,425
	1,146,135 avg.

Although shot blasting improved fatigue life greatly, no production equipment was available for this application and since combinations without shot blasting were found satisfactory, this operation was not used in production for the manufacture of steering knuckles. It was used, however, in the manufacture of transmission gears.

Tests on Gears

Transmission gears were originally made of SAE 4815 steel, which has no chromium but the nickel content ranges from 3.25 to 3.75 per cent. By testing production material on the dynamometer, 40 hr. minimum on a certain test was established as the baseline. These tests showed CX 4120 steel (no nickel and only 0.60 to 0.80 per cent chromium) to be satisfactory. However, when put into production, CX 4120 proved to be erratic inasmuch as failures ranged from 6 to over 40 hr. on dynamometer tests. Numerous changes in processing and heat treatment proved to be of little value. Shot blasting was tried and immediately the fatigue life was improved to well over the 40-hr. minimum.

Equipment was installed and now these gears are shot blasted in production. It was found that NE 8620 steel could be used as a satisfactory substitute, if it also was shot blasted.

Another aid in the development of substitute materials was the use of a non-burning type of carburizer containing no charcoal. The original steel used in a certain ring gear was of SAE 4320A analysis. Substitutes made of XC 4120 and NE 8724 were developed satisfactorily after improving the tooth contacts. However, NE 8124 could not be made to pass the dynamometer tests unless shot blasting was resorted to until the new type non-burning carburizer was used. The results obtained with this material were satisfactory since deeper penetration was obtained and the case was more uniform.

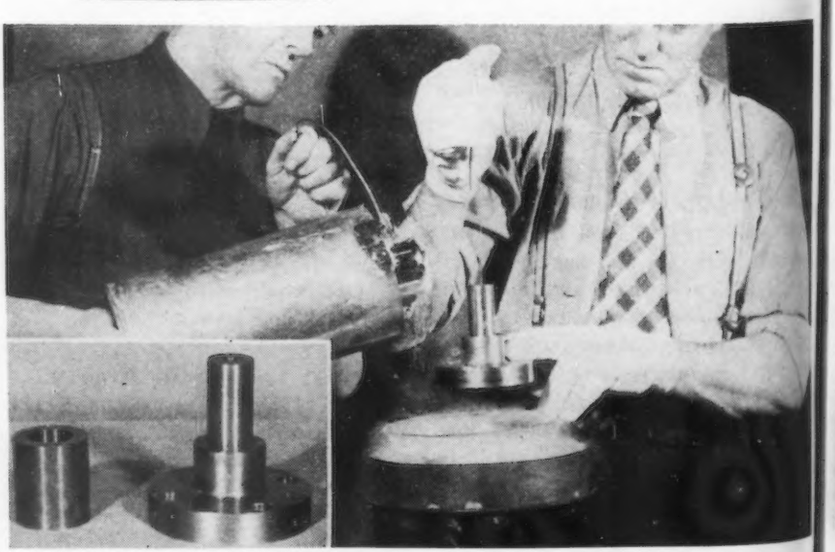
Non-Burning Carburizing Compound

To produce this material, coal is pulverized and the energizing chemicals mixed thoroughly through it. The mixture is then sintered into briquettes at 2000 deg. F. in a carefully controlled atmosphere. The briquettes are then broken into kernels of the proper size suitable for various carburizing operations. This produces material that does not fire as easy as charcoal and is longer lived due to the retaining of its potency even after being broken up. The energizing chemicals are an intimate part of the kernels. This is not true of previously used charcoal carburizers having the energizing chemicals coated on the outside of the kernels.

Looking into the post-war possibilities of substitute materials, the conclusion is that economics will be the principal factor that will determine the situation. For example, when nickel and chromium are no longer restricted, it is more likely that such elements will be used extensively in steels to replace lower grade alloys. While the cost of the basic raw material may be higher in the case of the better alloys than in the lower alloys, the heat-treat range is greater and the handling cost in processing is thus lower and the overall cost is less. The automotive industry has always been alert to any economic advantages to be gained through changes in materials or methods so that whatever may be learned by the war effort will not be lost after the war if it is worthwhile.

Shrinking Steel Parts With Liquid Nitrogen

TO shrink steel parts used in the manufacture of electric apparatus, General Electric uses liquid nitrogen at —410 deg. F. The shrinkage allows a diameter clearance of slightly less than 0.002 in. between the steel part and the hollow tungsten carbide cylinder which is later fitted over it to form a complete punch. Expansion of the shrunken part takes place quickly, forming a strong bond.



MISTY liquid nitrogen is being poured on the punch part which is then lowered into a container. The inset photo shows the steel part (right) and the tungsten carbide cylinder that fits over it.

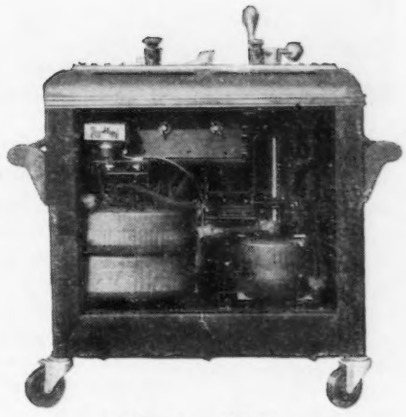
New Equipment . . .

Welding

New developments in welders and controls, together with electrodes and other accessories, are described in this week's review

A NEW a.c. transformer type welding machine, known as the Wilson Bumble Bee a.c. welder, has been introduced by *Wilson Welder & Metals Co., Inc.*, 60 East 42nd Street, New York. The most interesting feature of this welder is its low open circuit voltage of 42 volts. Two primary coils are used instead of one, with a magnetic contactor in the circuit of one primary. Each primary contributes approximately 42 volts to the total open circuit voltage. When the machine is idle, one primary is automatically cut out. When the electrode contacts the work, the second primary is thrown into the circuit, and if there were not a dead short,

the voltage would be 84-85 volts. When the operator draws an arc, this open circuit potential enables him to establish his arc quickly and begin welding. When welding is completed and the operator pulls out or lengthens his arc, the arc voltage rises. When it reaches 45 volts, the contactor opens and cuts out one primary, leaving only 42 volts in the open circuit.



A.C. Arc Welder

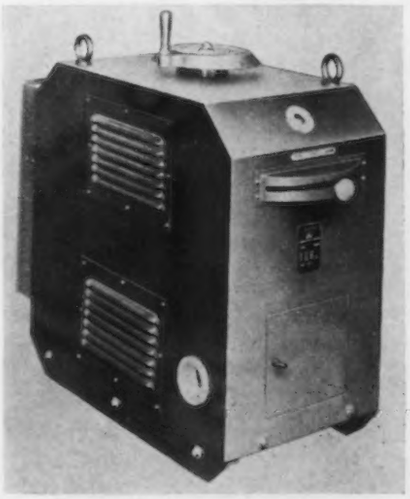
THE Hampton model "G" a.c. welder, made by *Hampton Electric Mfg. Co.*, 311 Archie Street, Oakmont, Pa., is designed for general welding and operates on a supply voltage of either 220 or 440 volts. It has a welding capacity of from 30 to 300 amp. and can be operated continuously at 225 amp. Welding current may be controlled by turning a crank on top of the machine, even while welding. Equipped with a thermostatically controlled, mercury arcless, automatic cut-out switch, the machine is protected against excessive overloads for a long interval of time. A stabilizer in the welding current controls and balances the voltage and current across the arc. Any a.c. electrode from 1/16 to ¼ in. can be used for either horizontal, vertical or overhead welding.

Arc Welding Electrode

A NEW arc welding electrode designed for welding aircraft assemblies, X-4130 aircraft tubing, etc., has been recently added to the line of the *Harnischfeger Corp.*, Milwaukee. Known as P&H Harcraft, the new product was first issued about June, 1942, and since has been in successful use in many plants. Harcraft electrodes are available in six sizes; in 9, 12 and 14-in. lengths. Specifically, the 1/16 in. electrode is made in 9-in. length; 5/64 in. and 3/32 in. diameters come in 12-in. length; and the ⅛ in., 5/32 in. and 3/16 in. sizes are 14-in. long. Physical and chemical properties and welding procedures are available on request from the Harnischfeger Corp.

Heavy Duty A.C. Welder

THE new G-R model 45, a manually operated welder with a welding range of 20 to 625 amp., is announced by *Glenn-Roberts Co.*, 1009 Fruitvale Avenue, Oakland, Calif. The operator may select the desired heat from two ranges by manipulating a switch. Stepless heat control is maintained throughout the entire output range. Trans-



former primaries and secondaries are amply spaced on separate legs of the core, preventing any breakover reaching the operator.

Welding Electrode

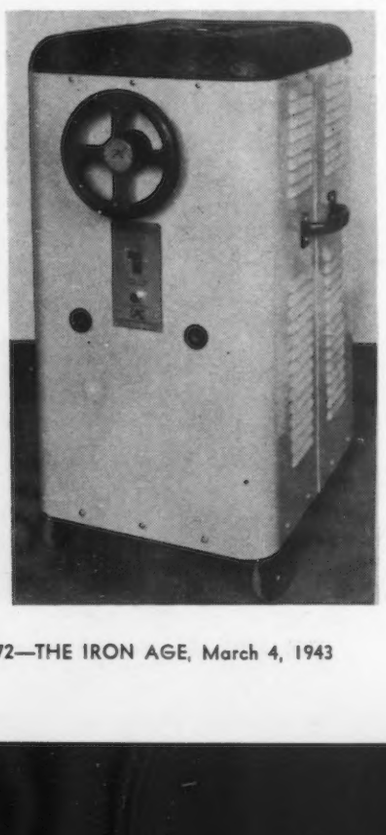
THE Silver Series electrodes have been announced by the *American Agile Corp.*, 5806 Hough Avenue, Cleveland. These electrodes eliminate waste inasmuch as a new cutting edge can be rebuilt to the worn tool shank. After the weld deposit is made, the tool is reground and put back in use. Other electrodes are designed for the salvage of worn trimming dies, forming dies, punch dies, etc. Also included is a chisel steel electrode that forms a chisel cutting edge that will withstand hard impacts. These electrodes cover a range from 40 to 70 Rockwell C.

Portable A.C. Welder

TRINDLE PRODUCTS, LTD., 2227 Calumet Avenue, Chicago, has announced an improved heavy duty, portable a.c. arc welder, known as model 125. For production welding these machines can be set up on benches. The machine is furnished with a vernier control panel and 16 welding heat stages ranging from 10 to 125 amp.

Arc Welder

ONE of the outstanding features of the Herco arc welders, made by the *Hercules Electric & Mfg. Co., Inc.*, 2416 Atlantic Avenue, Brooklyn, is the precision heat control which enables the operator to get minute heat adjustments over the entire transformer range. The exact heat is always available and may be changed while the machine is actually welding by turning a control knob which automatically operates a series of tap switches.



Arc Welding Control

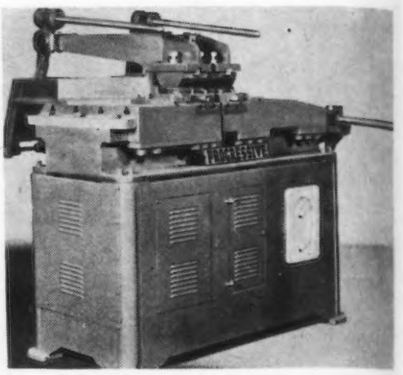
A NEW type of arc welding control, called the "Lincontrol," has been announced by the *Lincoln Electric Co.*, Cleveland. With the control strapped to his foot, the welding operator presses down on the pedal which moves the pin to operate a current control. As he exerts pressure, he increases the current. The control allows the operator to adjust the arc without changing his position.

Multiple-Operator Welder

A MULTIPLE-OPERATOR arc welding machine is offered by the *Hanson-Van Winkle-Munning Co.*, Matawan, N. J. The welder with one generator set will service a number of operators. The motor generator set has a capacity of 1500 amp. at 70 volts. It may be the stationary type, the motor may either stationary or portable. In be either a.c. or d.c. The semiportable type is a complete drive and control mounted on a single bed plate, completely wired.

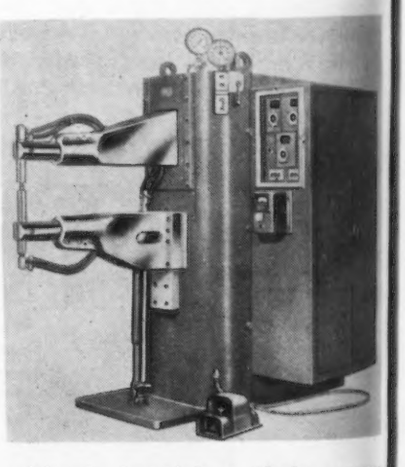
Flash Welder

THE first of a series of standardized flash welders has been announced by *Progressive Welder Co.*, Detroit. Outstanding feature of the new model "C" flash welder, rated at 150 kva., is the incorporation of a "Flash-trol" monitor which provides an automatic weld quality control by eliminating short circuiting of the flash welding arc. The Flash-trol unit warns of an impending short circuit in the welding arc. When this occurs, the forward movement of the feed platen is interrupted, the platen jumps back a few thousandths of an inch and then re-approaches. Upsetting speed and pressure itself is obtained on the welder through the use of a single and positive air hydraulic booster which forces oil in the proper quantity at high speed into the platen traversing cylinder. The cylinder is actuated by a relay which is tripped by the platen when the upset position is reached.



Resistance Welder

SCIAKY BROS., 4915 West 67th Street, Chicago, now offer a new rocker arm resistance welder, for the spotwelding of aluminum and its alloys. Features of the machine include adjustable electrode tips which may be set at any angle without impairing their proper welding position. All gages and dials are visible to the operator and are set on the frame of the machine. The machine supplies a pressure of 3000 lb. between the electrode tips from a supply line of 90 lb. using normal throat depth of 34 in. Welding stroke is ½ in. and retraction stroke 3½ in.



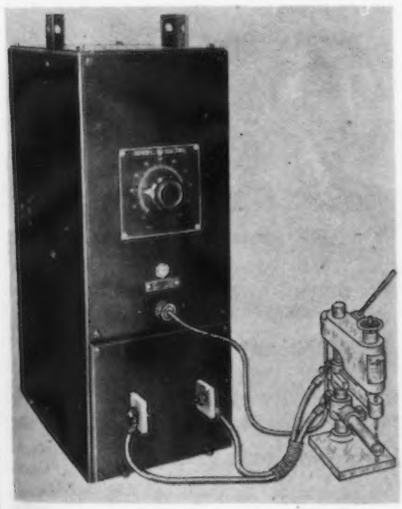
Hard Surface Welding Rod

TOUGHARD is the name of a hard-surfacing welding rod developed by the *Toughard Metal*

Sales Corp., 122 East 25th Street, New York. Toughard is highly resistant to abrasive wear and has a very high impact and percussion value. The medium hard rod has a hardness of approximately 60 Rockwell C, and surfaces produced from this rod have a hardness of from 60 to 64 C. Toughard faces are not brittle. It has also been used to tip metal chipping and cutting hammers and rock cutting drills without chipping or spalling.

Spot Welding Control

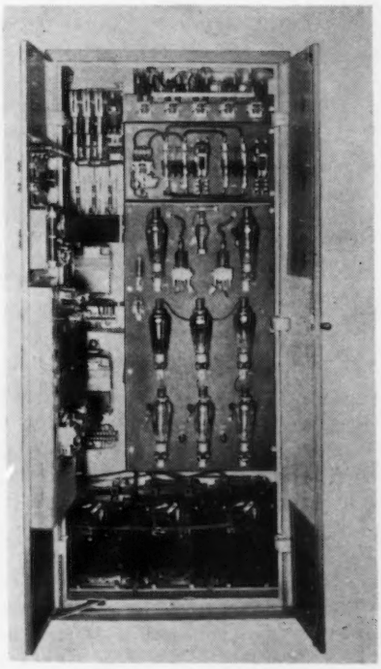
AN electronic half-cycle, synchronous control for operation of resistance welding machines has been announced by the *General Electric Co.*, Schenectady. Mounted in a protecting cabinet, the control is furnished in two types—one including a welding transformer and designed for bench mounting, and the other without a transformer



designed for wall mounting. Both types can be used with tongs or a bench welder. The new control incorporates heat control by the phase-shift method. Heat adjustment is made by a dial mounted on the front of the cabinet.

Electronic Control

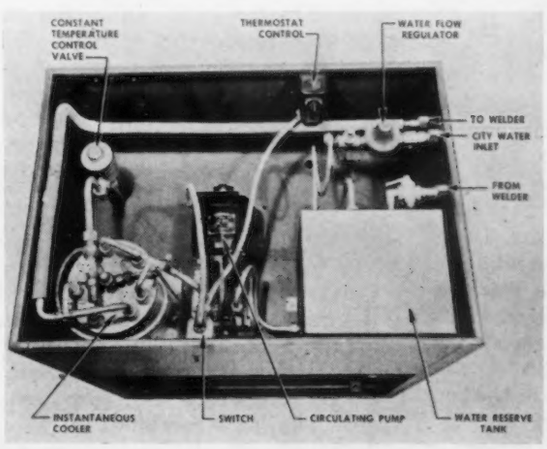
SIMPLIFIED construction is one of the features of the new electronic capacitor discharged resistance welding control announced by *General Electric Co.*, Schenectady, for the resistance welding of aluminum. The control consists of a charging circuit, discharge circuit, control station, Pyranol capacitors and sequence control, all mounted in a cabinet type enclosure. The



control station can be removed from the cabinet and attached to the welding machine.

Spot Welder Cooler

A SPECIAL self-contained cooling unit, designed to supply a constant flow of low temperature water to electric spot welder tips and transformers, has been announced by *Temprite Products Corp.*, 47 Piquette Avenue, Detroit. The unit can be used to operate one, two or three separate spot welders, depending upon the maximum heat load of the welders and the resistance to flow through the welder water circuits. The system is capable of circulating 120 gal. of water per hr. against a spot welder pressure drop of 100 lb. gage. Pump is equipped with an adjustable bypass valve controlling the rate of water flow through the spot welder assembly.



Seam Welder Controls

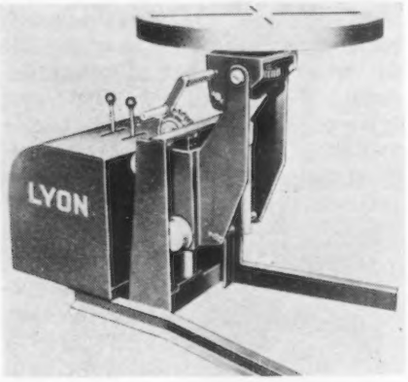
WELTRONIC CORP., E. Outer Drive, Detroit, announces the new model 40 timer for use with seam welders, as well as spot welders. Of the synchronous type, and incorporating phase-shift type heat control, the unit always starts and stops current flow at the zero point of the current wave, while current duration is adjustable to the exact number of cycles desired. When used for single-shot type of spot welding, the toggle switch is thrown to the "on" position and the dial controlling the number of pulsations is set to "1." With this setting the control is a straight synchronous spot weld timer with phase shift heat control. When used for seam welding, heat and cool controls are set to the values desired and the toggle switch is thrown to the "off" position which cuts out the pulsation limiting control.

Welding Positioners

CULLEN - FRIESTEDT CO., Chicago, announces the addition of two new giant welding positioners to their line—the model 200 which has a capacity of 20,000 lb. 20 in. away from table, 8 in. off center; and the model 300 with a capacity of 30,000 lb. 24 in. away from table, 18 in. off center. These units are mounted on a single pedestal which is adjustable for height. They have a table which revolves completely around and tilts to any position up to (or down to) 135 deg. off horizontal. They are motorized and are operated by a pushbutton panel so that welder can swing and tilt weldments to any position without cranes or handling crew.

Welding Positioner

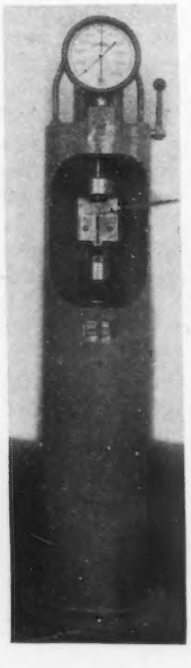
THE Lyon hydraulic elevating welding positioner, offered by the *Lyon-Raymond Corp.*, Greene, N. Y., has a tilting and elevating table powered by a motor driven hydraulic pump and revolves in any position mechanically by worm gear

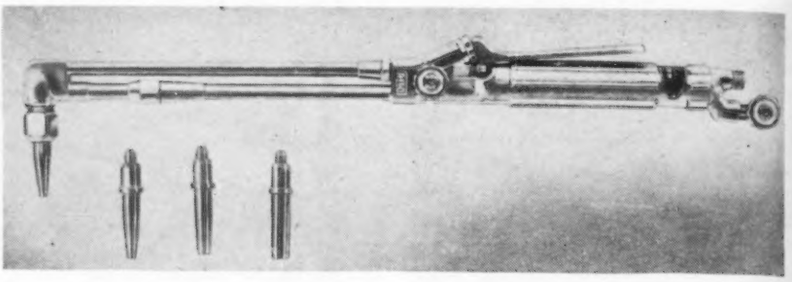


arrangement. The table may be revolved by a hand crank which operates worm and worm gear 360 deg. in any position. The table may be removed by taking out four cap screws so that welding fixtures can be attached to the same top plate to which the table is attached.

Spot Weld Testing Machine

A SPOT weld testing machine to check the strength of spot welded samples in the factory has recently been developed by the Baldwin Southwark Division of *Baldwin Locomotive Works*, Philadelphia. The machine is equipped with specially designed, self-alining, lever-operated open face grips with renewable hard file faces. Grips accommodate offsets in welded specimens from the smallest gage to ¼ in. thick. No backing plates or liners are needed. An 18-in. diameter steel base, and low center of gravity, facilitate hand moving of machine. Hoisting hood is at the top for crane handling. An 18-in. precision dial set atop the machine indicates load. Cylinders with a 2-in. stroke are also set in the top section.



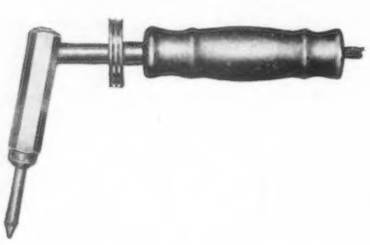


Cutting Torch

IN addition to regular plate cutting, the Model NC cutting torch, introduced by *National Cylinder Gas Co.*, 207 West Wacker Drive, Chicago, will perform such jobs as hole piercing, cutting rusty multiple plate, billet deseaming, cast iron and rivet washing. A new mixing principle provides fast preheating, and oversize high pressure oxygen passage permits unrestricted flow of cutting stream. Stainless steel oxygen and acetylene needle valves are non-seizing, nonscoring to provide sensitive and positive preheat flame adjustment. A new cutting attachment is also available for use with these torches.

Electric Soldering Iron

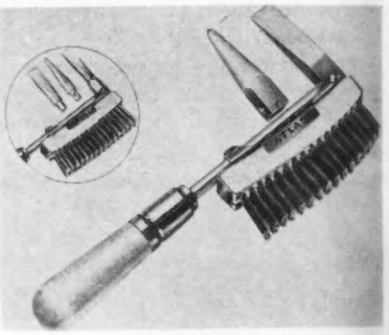
A SOLDERING iron known as the hatchet or offset type of iron has been introduced by *Hexacon*



Electric Co., 144 West Clay Avenue, Roselle Park, N. J. The iron is made up in wattages of 80, 100, 150, 175 and 200; tip sizes ⅜, ½ and ⅝ in. The design is of the plug tip type with replaceable elements and tips. Heating element is housed in damage-proof hexagon-shaped barrel. Due to hexagon shape, the iron can be held in vise when replacing tip without danger of denting housing or damaging element.

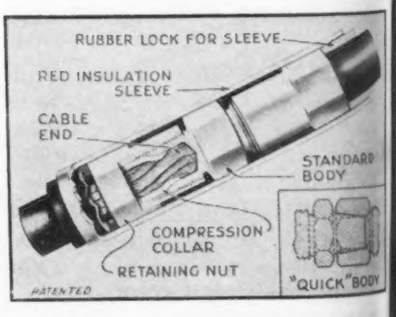
Weld Cleaning Tool

A NEW and improved weld cleaning tool for welders, known as the Dual-Tool, has been announced by the *Atlas Welding Accessories Co.*, 307 Boulevard Building, Detroit. The tool combines a wire bristle brush and a slag-removing bit in one unit and features a specially-developed brush holder which permits removal of brush for reversing or replacement by inserting screw driver or other sharp object at rear end of holder. Every part of the tool is replaceable.



Connectors for Welding Cables

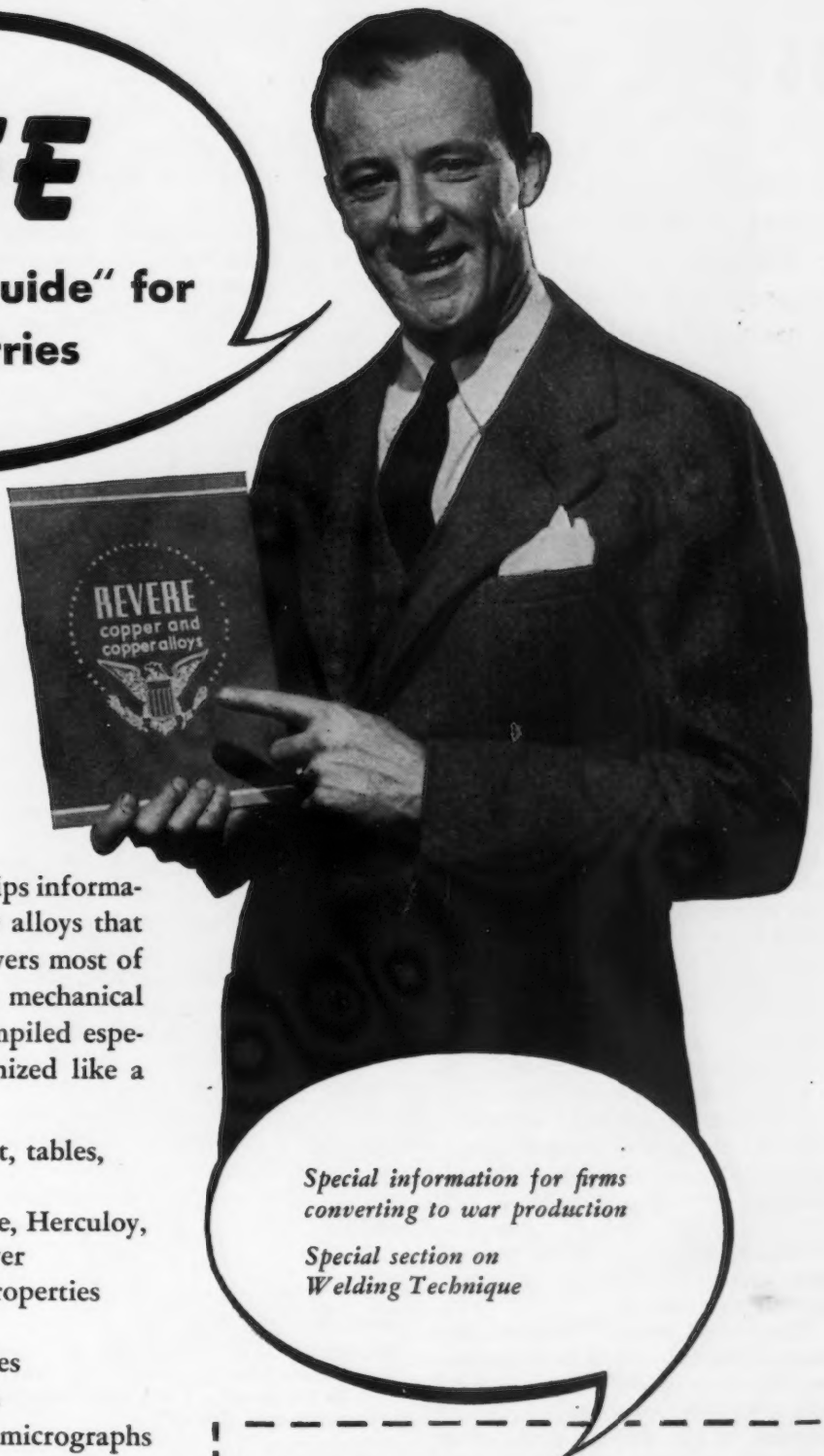
EASE and speed of installation, full protection of cables and conservation of vital materials are some of the advantages claimed for the new Cable-Tite connectors and lugs for welding cables, made by the *National Cylinder Gas Co.*, 207 West Wacker Drive, Chicago. The body of the standard connectors is



one piece. The "quick" models, recommended for use where the whip-end and main cables connect, have a two-piece body. A slight twist while connecting locks the body into one unit. Compression collar grips the cable-end and shapes it into a head which cannot work out or be pulled out of the fitting.

FREE

New "Copper Guide" for war industries



Here is a book that puts at your fingertips information about Revere copper and copper alloys that users most frequently need. That answers most of the questions asked of Revere by the mechanical industries engaged in war work! Compiled especially for your use today. And organized like a handbook for easy reference.

It covers subjects like these in text, tables, illustrations:

Revere alloys — Copper, Brass, Bronze, Herculoy, Cupro-Nickel, Nickel Silver
Chemical, physical and general properties of the alloys
Uses and working properties
Technology of the alloys
Commonly used grain sizes, with photomicrographs
Revere manufactured forms
Weights and dimensions of pipe and tube
The Revere Technical Advisory Service

Special information for firms converting to war production

Special section on Welding Technique

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

Executive Offices: 230 Park Avenue, New York

Sales Offices and Distributors in Most of America's Major Cities

Revere Copper and Brass Incorporated
230 Park Avenue, New York, N. Y.

Gentlemen: Please send me your new book, "Revere Copper and Copper Alloys".

Name.....

Title.....

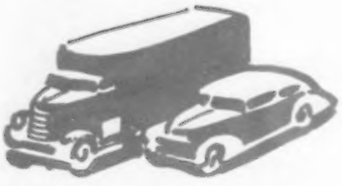
Firm Name.....

Street.....

City.....

Assembly Line . . .

• Automotive Industry expected to announce correlated manpower program . . . Manpower pooling suggested.



DETROIT—The manpower pot is boiling with developments in the automobile industry, and announcement may be forthcoming soon that a correlated program has been set up to tackle the problem of help shortages and efficiency, the objective being to utilize all available men and women to the utmost.

Any such program would necessarily be a broad one, running all the way from improvement of health to installation of incentive systems. In a word, it would have to function in the sociological sphere of manpower just as the Product Division of the Automotive Council for War Production has functioned, to discuss and exchange information on mutual production problems. It would have to deal with labor relation techniques as well as solutions.

There are several reasons why such a program should be organized. In the opinion of the industry leaders who have been discussing the idea, in addition to the obvious need, which will grow to major proportions next summer as schedules reach toward peak, of having no waste manpower motion. The program, if it is undertaken, would be an agressive step taken before any criticisms could be forthcoming from government or labor or the general public that the automobile industry is not functioning at peak efficiency due to its own mistakes. It might serve also to educate the employees of the automotive plants and others as to the obscure causes, such as war strategy changes and materials unavailability, which often may lie behind schedules curtailments.

ABSENTEEISM, of course, would be a primary study sphere of such a program, for no plan to utilize manpower most efficiently could be conceived without an effort to cut down the four to six per cent loss in working time caused by short and badly grounded absences from work. Any moves in this direction, it is apparent, would have to be tinged by efforts to improve worker morale—so the job would have its psychological aspects also.

With the proportion of women workers steadily increasing in automotive plants, their special problems could be expected to occupy a major place in the planning. Recruitment, job selection, training, sanitary and restroom facilities and other problems would be indicated for treatment.

Special problems of women workers also involve the question of nursery facilities for children, and this is an enlarging problem in Detroit today. Abandonment of the WPA nursery project, along with all other WPA projects, has temporarily eliminated almost all facilities except private ones for the care of children of working mothers. It is estimated that somewhere around a third of female employees have children of age requiring supervision while the mother is out of the house. Federal funds are obtainable for such projects, authorized by the Lanham Act, but so far as Detroit is concerned there is a considerable difficulty in breasting the barriers of red tape along the way to the money. Child care experts in Detroit cast a fairly worried frown at most of the private facilities likely to spring up as the need for them arises; and in the light of that situation it may be that the production plants themselves will provide nursery facilities for children—in which case "paternalism" charged against management from time to time by suspicious union leaders might well become "maternalism"!

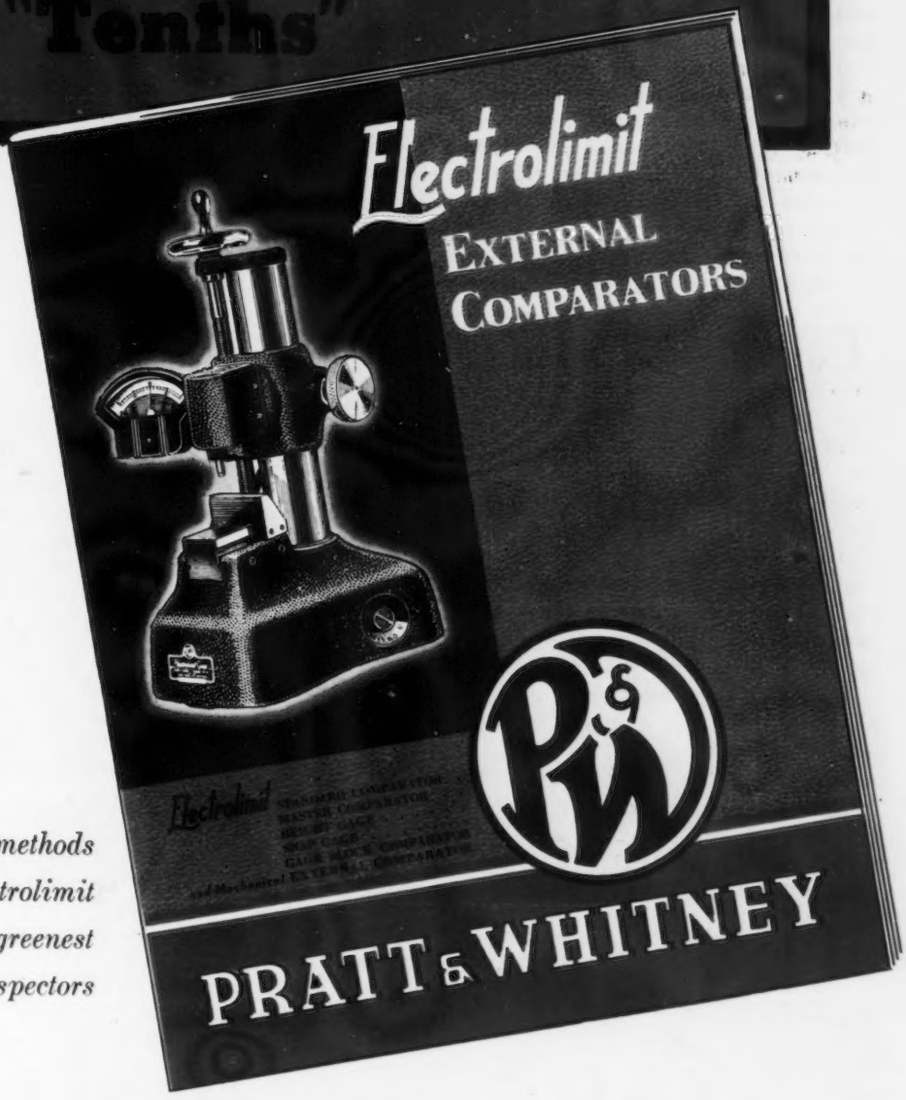
Study would also be logical on proposals for pooling of manpower, or some approximation thereof, a subject discussed in last week's Assembly Line. Originators and developers of the pooling idea would utilize manpower to the maximum by shifting groups of workers from momentarily reduced operations to other plants in which requirements for help exceed supply. In this connection it might be added that intensive inquiry into this idea during the past week or so has aroused somewhat of a doubt in management minds that a workable plan of this sort could be set up; and labor has much this same idea on the subject. Nevertheless, in fairness to the entire manpower conservation idea, pooling should have the benefit of every thorough examination before it is discarded—or accepted, either.

The importance of this proposed new program, only the high points of which can be touched pending formal announcement of a start to the

ROMMEL JEEP: This German conception of a jeep which is a tractorized motorcycle was used by the Nazi Afrika Korps for hauling ammunition in the desert. First knowledge of this type of equipment came with the retreat of Rommel.

Harris & Ewing

Even *Green* Operators can Inspect *Rapidly* ...to "Tenths"



This New Bulletin Tells How

Accurate, high-speed gaging methods made possible by P&W Electrolimit Comparators actually turn the greenest operators into competent inspectors almost overnight.

If P&W Comparators did no more than that, they'd still be valuable additions to the equipment of any precision metalworking plant today. But they do *far* more: they eliminate "feel," pass okay parts that might be rejected by less positive methods, check parts *at the machine* with laboratory accuracy.

INVESTIGATE the speed-up possibilities of Pratt & Whitney Electrolimit Comparators — this new bulletin tells all.

COMPANY EXECUTIVES: Your free copy will be sent promptly if you'll request it on your company letterhead.

PRATT & WHITNEY
Division Niles-Bement-Pond Company
WEST HARTFORD • CONNECTICUT

project, can hardly be overestimated. The tooling job in the automotive plants has nearly ended. The integration of know-how and facilities and ideas which originated in the industry with the formation of the Automotive Council has been a factor without which today's progress would not have been possible except by borrowing time measureable in terms of years. Now the problems of operating such facilities at maximum are hinging largely on the availability of manpower, the one factor becoming more critical by the week. Any program which will utilize available manpower to the utmost is as essential as can be conceived at this time.

THE basic indications of the effect of automobile production stoppage now begin to be seen. Incomplete figures to the National Automobile Dealers Association indicate that approximately 2,250,000 passenger cars and trucks disappeared from United States highways during 1942. However, this gap was made up in small degree by the entrance into service of about a quarter of a million passenger cars released under the rationing rules of OPA.

Registration reports for 36 states and the District of Columbia, comprising about 80 per cent of all registrations in the country, indicated 28,553,945 passenger cars and 4,378,780 trucks in service in the country at large, a total of 32,932,725. This reflects a decline of 1,758,175 passenger cars and 192,450 trucks from the registration total of 34,883,350 registrations at the end of 1941, despite augmenting of the vehicle pool by 252,424 passenger cars released under rationing.

The net decline in passenger cars on the road carries some rather interesting implications. A comprehensive study on normal expectancy of future passenger car registrations, developed about a year ago, concluded that as of Aug. 1, 1942, there would have been a decline of approximately 1,000,000 units from that date in 1941, and that on Aug. 1, 1943, there would be a decline of about 2,400,000 from Aug. 1, 1942. The reduction of 1,758,175 passenger cars as of Jan. 1 tallies with these expectancies, both analyses tending to confirm each other.

The significance, then, lies in the fact that a normal junking ratio is developing during the war period, notwithstanding the efforts of private owners to hold their cars on the road longer than they would in the presence of a normal quantity or replacement vehicles.

Harking back to the study made a year ago, therefore, it might seem reasonable to assume that by Aug. 1, 1943, the pool of passenger cars on the road would have declined close to 3,500,000 units, and that if there is no new passenger car production up to Aug. 1, 1944, the decline would have increased to 6,000,000 or more. There is indicated, therefore, a most substantial replacement market awaiting the end of the war, whose size will be developed out of necessity more than out of buying induced by desire, or advertising, or any other comparatively extraneous reasons. In a word, the post-war outlook for automobile production is already good by reason of replacement requirements alone, unless we come out of the war in a condition of quasi-bankruptcy.

And at the same time, quasi-bankruptcy for the country might not necessarily apply to the individuals of the country as well. By and large they are purchasing war bonds today, storing up a tremendous post-war purchasing power. With cars on the road ageing by the day, stretched as much as possible (as a group) beyond normal life expectancy, it is reasonable to expect that a good share of this bond-built purchasing power will be turned into automotive industry business when new cars once more come into the market.

TURNING to another phase of the picture, rationed sales of over slightly 250,000 passenger cars during 1942 is a result below the expectations of OPA. Selling schedules called for disposition by March 1, 1943, of 340,000 out of the 480,000 cars on hand a year ago. No more than 290,000 or so have been moved up to now, leaving a balance today of around 200,000 units.

In the light of these figures, the liberalization of rationing policies governing new car sales, announced last week, is dictated by need as much as by desire. Anyone filing a statement of need can now obtain one of the few 1941 cars left. Any $1,500-or-more 1942 model can be bought by persons having a non-serviceable car (which is defined as a pre-1940 model or one with 40,000 miles of travel). Any $1,500-or-under car can be bought by a holder of a "C" gasoline ration if he does not have a serviceable car.

These rule loosenings will probably move out car stocks in good shape, freeing RFC of its commitments to purchase all unsold cars offered to it next July. Rationing of new cars, first commodity to be restricted in this country in World War II, is now little more than a formality. On the dealer side, service is of more interest today than sales.

Press Assn.

SECOND SUB IN 1943: The U.S.S. Grevalle, second submarine to be launched at the Portsmouth, N. H., Navy yard this year, enters the water at its launching Feb. 22. Mrs. Charles W. Fisher, wife of Rear Admiral Fisher, was the sponsor. Mrs. John A. Leonard of Washington, wife of a submarine officer, was matron of honor.

How Carpenter has INCREASED THE USEFULNESS of *Another* Metal . . .

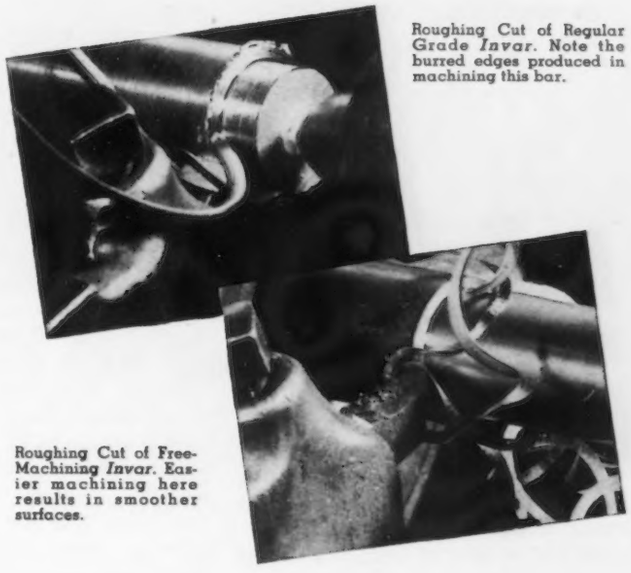
Just as you have been able to use Stainless Steel to greater advantage since 1928 when Carpenter invented *Free-Machining Stainless*—you can now take full advantage of the properties of INVAR, as a result of this timely new development.

Invar, a 36% nickel alloy that expands only a tenth as much as carbon steel when subject to temperatures up to 400° F., used to be as tough to machine as straight 18-8 Stainless Steel. *Invar* was so tough to machine that engineers often gave up the idea of using it, even when they needed the metal's low expansion properties.

So Carpenter research went to work, and now we announce an *Invar* that is actually easy to machine . . . *Carpenter Free-Cut Invar "36"*. Through the addition of selenium to the alloy, its cutting qualities have been improved, while its low expansion properties remain exactly the same.

Invar (in the form of strip) is being used in making parts for aircraft controls, thermostats, special radio parts and other devices that must remain accurate even where temperatures vary. But now that bars of *Invar* can be easily machined, this unusual metal will be able to take over new jobs. Designers will be able to adopt it without fear of their recommendations being called "impossible" by production men.

For more information about *Carpenter Free-Cut Invar "36"* and its properties, get in touch with our Metallurgical Department. Or, ask for our latest bulletin.



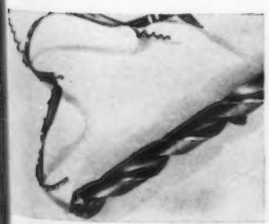
Roughing Cut of Regular Grade *Invar*. Note the burred edges produced in machining this bar.

Roughing Cut of Free-Machining *Invar*. Easier machining here results in smoother surfaces.

Tests Made To Determine Machinability of Carpenter Free-Cut Invar "36" . . .

The comparative tests described below were made in order to provide data on the relative machining properties of the regular grade of *Invar* and *Carpenter Free-Cut Invar "36"*. In each case, standard high speed cutting tools, ground with standard angles, were used.

DRILLING—Standard drill press with automatic feed and 7/16" round high speed drills used on test blocks 2 3/16" thick. Feed: .004" per revolution; Spindle Speed: 665 R.P.M.



Tool used and chips produced in drilling regular grade *Invar*.

Tool used and chips produced in drilling free-machining *Invar*.

The drill used on the test block of regular Invar failed completely after penetrating to a depth of only 1 1/16" (see photo). An identical drill used on the block of free-machining Invar drilled through the 2 3/16" block without difficulty, and was in good condition at the end of the test (see photo). Note the differences in the chips produced by each of these drilling operations. They provide further evidence of the machining qualities of Carpenter Free-Cut Invar "36".

ROUGHING CUT—1" round bars cut with high speed tools on a standard lathe; feed .0055" and cut 3/32".

COMPARATIVE ROUGH MACHINING TESTS

(See above photographs)

REGULAR GRADE INVAR		Carpenter FREE-CUT INVAR "36"	
Speed *sur. ft./min.*	Results	Speed *sur. ft./min.*	Results
28.80	*Satisfactory*		
49.22	*Tool failed after cutting 1" along bar*		
82.47	*Tool failed after only a few revolutions*	82.47	*Excellent*
		137.45	*Excellent, with no evidence of tool failure*
		137.45 was top speed for lathe used, so feed was increased from .0055" to .0125"—with results still excellent.	

Our latest engineering bulletin provides additional information on the properties of Carpenter Invar "36" and Carpenter Free-Cut Invar "36". We'll gladly send you a copy.

THE CARPENTER STEEL CO., 121 BERN ST., READING, PA.

Washington . . .

• Congress shows impatience over manpower situation . . . Signs of disfavor with McNutt illuminated by rejection of budget for USES . . . Social problems raised in addition to production difficulties.

WASHINGTON—The course of Paul McNutt in dealing with manpower hasn't pleased Congress. Members feel that he has followed the wishes of organized labor in resisting national service legislation. Signs of his disfavor were illuminated last week by a House appropriation committee turndown of a request for $2,000,000 to run the United States Employment Service. USES would provide clerical help in administering WMC's work or fight order.

Congressional complaint arises from information from industry that orders from Washington are not always clear, and inasmuch as local Selective Service Boards are not obliged to follow WMC's occupational deferment recommendations, skilled workers are being drafted in large numbers. Moreover, not only single men and men whose only dependents are collateral or who have no one dependent upon them except their wives, but mechanically experienced married men with children are being inducted. This is the story told by officials in eastern airplane plants, which hold Navy contracts.

While Congress is touchy about industrial workers, of greater interest to most members are farmers upon whom the nation's food supply depends. Congress is calling for deferment of agricultural workers, and while the Army apparently has convinced Congressional leaders that an 11,000,000-man Army is necessary, the drive to defer farmers is still on. Legislation to this end has been introduced.

LABOR sources say organized labor is opposed to national service legislation because unions would be deprived of income through manpower shifts if Congress refused to force workers who were drafted for factory work to become union members. Labor leaders know that the Congress in its present mood of revolt would not be likely to knuckle to demands for a universal closed shop. To Mr. McNutt's credit, however, he originally favored national service legislation. But, it is understood that the White House soon disabused his mind of this notion, presumably at the insistence of labor groups.

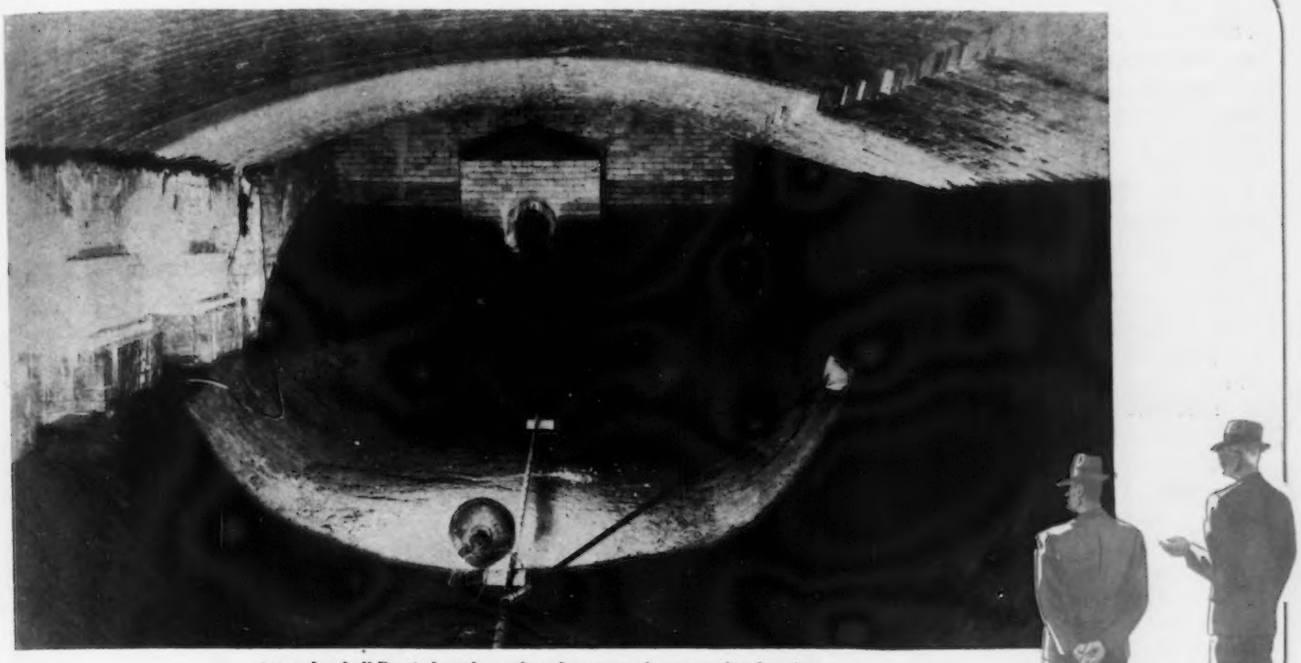
The concept of draft of workers has been received by many with mixed feelings. Employers are for it if it would assure them of adequate manpower supply to fill war contracts and if the whole occupational deferment question would be planed down smoothly. The idea is revolting to the average American because he has been found to be singularly resistent to regimentation. On the other hand, the coercion of the work or fight order is just as disagreeable. First, Selective Service in Washington does not control the action of local draft boards, and if a man follows the order neither he nor his prospective employer has any guarantee that he will be deferred. Secondly, there is the question of pride and morale. Even if draft board action were consistent, the average man would feel more at peace with his conscience if he were in a uniform of the United States Army.

If Congress passes a law, on the other hand, making it mandatory that groups of persons with certain skills go to indicated industries, there would be some dignity about a man's moving from a non-essential to an essential industry. Furthermore, if occupational deferment were made a matter of law, production would benefit since workers would be more or less frozen in their jobs.

ANOTHER union objection is said to be the threat that organized labor will lose a selling argument for union membership. Some observers allege that union bosses are promising draft deferment to new workers who join up, and keeping workers out of jobs if they do not. If this practice is at all prevalent, it goes without saying, that Congressional action to prevent the sandbagging of American citizens for the good of organized labor's treasury is certain, even though the war effort is served incidentally. Certain Selective Service

ELEANOR IN LIMELIGHT: Shown at the head table of the Washington Day dinner at the Mayflower Hotel, are, left to right, Attorney General Francis Biddle; Maj. Gen. Alexander Archer Vandegrift, U. S. Marine Corps, recently returned from the Solomons; Vice-Pres. Henry A. Wallace, Mrs. Franklin D. Roosevelt, Speaker of the House Sam Rayburn and Postmaster General Frank C. Walker, new National Democratic chairman.

Harris & Ewing



A completed all-Ramix hearth, ready to heat up and prepare for charging.

141 more heavy bombers for Tunisia from ONE RAMIX hearth job

HERE is more proof of the value of Ramix in the production of steel for war:

Last October an open hearth shop in the Midwest installed its fifth successive all Ramix bottom. The entire cost of the hearth—including labor, fuel and refractory—was $7,855.80. This was 10% less than the cost of a conventional magnesite-and-slag hearth that had been installed in a similar furnace of the same size at this shop just a year earlier.

While this cost reduction is remarkable enough, a more significant saving was that made in construction time. It had taken 330 hours to burn-in the old type bottom, but the modern one of Ramix was rammed, heated up and made ready for its first charge in only 138 hours.

This time saving of 192 hours—attributable to the use of Ramix—enabled the furnace to begin producing steel 8 days ahead of time. In these 8 days the furnace made 2112 tons of steel—enough extra steel to manufacture 141 four-engine bombers or 56 medium tanks to speed up the 1943 Allied Victory program.

Ramix is one of a complete line of basic refractories now at your service. Ready, also, to assist you with your refractory problems, are Basic Service Engineers—expertly trained men, long experienced in open hearth practice, anxious to help you get maximum tonnage from your furnaces at lowest possible refractory cost.

BASIC REFRACTORIES, INCORPORATED
CLEVELAND, OHIO

PRODUCERS OF MAGNESITE AND DOLOMITE HEARTH MATERIALS FOR STEEL FURNACES

officials are opposed to giving workers legal rights for fear working men will ask courts to guarantee them—thus bringing what has been pure administrative action up to this time under the review of the judiciary. They say that men could tie their draft cases up in the courts, and avoid the draft indefinitely, thereby defeating the purpose of the Selective Service Act.

It is certain that no member of Congress wishes to impede the war effort. Representatives and senators have pointed out that the only way labor supply can be controlled or directed to the places where it is needed is through the orderly process of law and not by cajolery.

AN example of what is happening to labor supply is that of the gigantic Ford plane assembly plant at Willow Run. There, Ford officials have told government representatives, absenteeism is very high and they could use 30,000 more workers, 50 per cent more than the plant now employs. The difficulty seems to be that workers object to traveling 30 miles each day during the winter. Workers prefer employment in Detroit, where there is adequate public transportation. The productive quality of workers is said to be low because of so many inexperienced people being hired and it is the despair of the plant that not enough foremen are available.

Aside from the fact that production is suffering from mismanagement of manpower, the indiscriminate taking of family men into the armed services raises many ugly social problems. Government bureaus report that juvenile delinquency in homes where both parents are away all day is astronomically high. Married women with children are being forced into war jobs since the government compensation to families of men in the armed services is not high enough to wholly support families. Children are being foisted off upon relatives, schools, and are too frequently being left to their own devices, as a result.

Observers say that the country should furnish all of the men the armed forces require, whether they are married or single, but that skilled workers needed in war production should be deferred as long as possible. If existing supplies of combat age men are running low, then there is no reason men over 38 should not be recruited for war work.

THE BULL OF THE WOODS — BY J. R. WILLIAMS

HA-HA! HE THOUGHT A SNAKE BIT HIM! I DON'T SEE HOW A GUY COULD BE ABSENT-MINDED ENOUGH TO THINK THAT A SNAKE WOULD BE IN A BIG MODERN PLANT LIKE THIS!
THAT'S JUST TH' REASON! IT'S SO MODERN THAT ONLY A FEW MONTHS AGO WE WAS PICKIN' WILD BERRIES RIGHT ABOUT HERE--AND THERE WAS SNAKES IN TH' BUSHES!
COPR. 1943 BY NEA SERVICE, INC. T. M. REG. U. S. PAT. OFF.
MEMORY LANE
J.R.WILLIAMS
3-5

Cited for Award

• • • **The following plants have recently been awarded the Army-Navy "E" or an "E" renewal, for outstanding performance on war work:**

Absorbent Cotton Company of America, Valley Park, Mo.
American Cast Iron Pipe Co., Birmingham.
Anacin Mfg. Co., Knoxville, Tenn.
Baker Brothers, Inc., Toledo.
Bullard Co., Bridgeport, Conn. (star).
Cochran Foil Co., Louisville, Ky.
Continental Motors Corp., Muskegon Plant, Muskegon, Mich.
Dexter Folder Co., Pearl River, N. Y.
E. I. du Pont de Nemours & Co., Inc., Plants 1 and 2, Alabama Ordnance Works, Sylacauga, Ala.
Electric Vacuum Cleaner Co., Inc., East Cleveland, Ohio.
Exposition Cotton Mills Co., Atlanta.
Galanot Products Co., Alliance, Ohio.
Goslin-Birmingham Mfg. Co., Inc., Birmingham.
Harnischfeger Corp., Milwaukee (star).
Hendrick Mfg. Co., Carbondale, Pa.
Hinson Mfg. Co., Waterloo, Iowa.
Ingram-Richardson Mfg. Co., Beaver Falls Plant, Beaver Falls, Pa.
Johns-Manville Corp., Borough of Manville, N. J.
Michigan Seamless Tube Co., South Lyon, Mich.
National Electric Instrument Co., Inc., Elmhurst, N. Y.
National Machinery Co., Tiffin, Ohio.
Newnan Cotton Mills, Newnan, Ga.
Porcelain Metals Corp., Louisville, Ky.
Pressed Steel Car Co., Inc., McKees Rocks Plant, McKees Rocks, Pa.
Queen City Steel Treating Co., Cincinnati.
Republic Steel Corp., Cleveland Plant, Steel and Tubes Division, Cleveland.
Rex Cutlery Corp., Irvington, N. J.
Rice Stix Dry Goods Co. Plant, Farmington, Mo.
Seamless Rubber Co., New Haven, Conn.
Simmons Machine Tool Corp., Albany, N. Y. (star).
Standard Forgings Corp., East Chicago Plant, East Chicago, Ind.
Standard Oil Development Co., Esso Laboratories, Bayway, N. J.
Trion Co., Trion, Ga.
Tweedie Footwear Corp., Versailles, Mo.
Wagner Electric Corp., St. Louis.
Waterhouse Co., Webster, Mass.
Willamette Hyster Co., Peoria Plant, Peoria, Ill.

Maritime Commission "M"

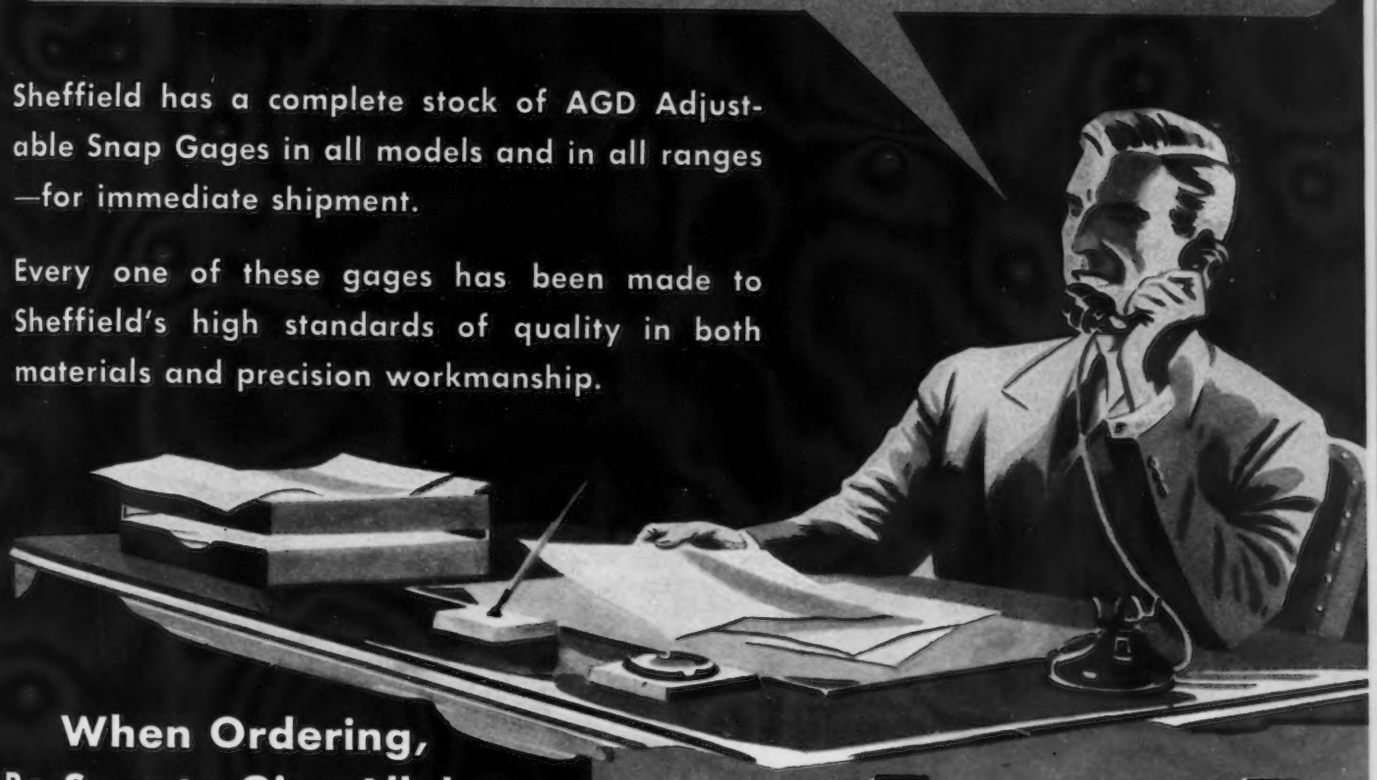
Buckeye Iron & Brass Works, Dayton, Ohio.
Columbia Steel Co., Pittsburgh, Cal.
Colvin-Slocum Boats, Inc., Amesbury, Mass.
Eastern Cold Storage Insulation Co., New York.
General Machinery Co., Hamilton, Ohio (star).
John Lucas & Co., Inc., Gibbsboro, N. J.
Maine Steel Products Co., South Portland, Maine.
Mercer Tube & Mfg. Co., Sharon, Pa.
Pitcairn Co., Barberton, Ohio.
Simplex Wire & Cable Co., Cambridge, Mass.
Socony Paint Products, New York.
Trill Indicator Co., Pittsburgh.

SNAP GAGES?

We Can Ship Today!

Sheffield has a complete stock of AGD Adjustable Snap Gages in all models and in all ranges —for immediate shipment.

Every one of these gages has been made to Sheffield's high standards of quality in both materials and precision workmanship.



When Ordering, Be Sure to Give All the Following Information:

State Frame Model and Frame Size. Stipulate whether gage is to be set and sealed (allow additional day on orders for set and sealed gages). Give complete marking instructions if set and sealed.

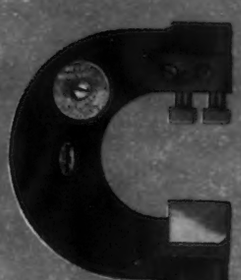
FOR SPECIFICATIONS

SEE SHEFFIELD HANDBOOK No. 42-2

PAGES 150-153

AGD MODEL A

AGD MODEL SB



AGD MODEL SC

AGD MODEL SMC

THE SHEFFIELD CORPORATION

DAYTON, OHIO, U. S. A.

SHEFFIELD GAGES

WEST COAST . . .

• Work stoppage unveils new union weapon . . . National Aircraft strike held unlikely . . . WLB wrestles with shipyard precedent in determining aircraft wage . . . Parts remain production bottleneck.

LOS ANGELES — Despite threats by Seattle AFL officials to incite work-stopping "meetings" at aircraft plants throughout the country, issues at stake make the union row with the War Labor Board basically a Pacific Coast party, with outsiders invited but not likely to attend.

Nationally, the greatest significance of last week's "meeting" of Boeing workers which closed down the company's two plants in the Seattle area lies in the unveiling of a new protest technique which accomplishes the purpose of a quickie strike, but avoids by a hair's breadth public abhorrence of unions which officially call workers off the job. Labor publications for some time have made it clear that union officials have been puzzled to find a practical weapon to enforce their demands without treading on the toes of public and governmental opposition to any action officially halting war production work. The device born in Seattle last week consists merely of announcing a union meeting away from the plant during working hours. Inasmuch as union meetings have been known to have been held with few members present, leaders reason that they cannot be brought to task if 97 per cent of the current shift decides to attend with fanfare—as was the case at Boeing last week. If the reasoning behind this technique proves to be sound, even if Coast aircraft workers' meetings fail to achieve their objective, the "meeting" may prove to be the successful 1943 candidate to replace the strike and slowdown as labor's chief weapon.

The Coast action was not aimed directly at employers. Ostensibly, it was taken to hurry the War Labor Board to announce promptly its determination of new wage standards and job classifications for employees of the nine principal West Coast airframe manufacturers.

"All we ask is that the War Labor Board says something — yes or no," proclaimed a Seattle union official.

Evidence that something more than "yes" or "no" was desired is contained in a statement by a southern California union official a few days earlier, when it appeared a decision unfavorable to the unions was imminent, that "the War Labor Board must be prepared to take full responsibility for its decision".

Failure of the War Labor Board to announce a decision, after fumbling with the pay and job standardization problem for nearly nine months, in itself lends credence to the union belief that favorable action could be forced by mass activity.

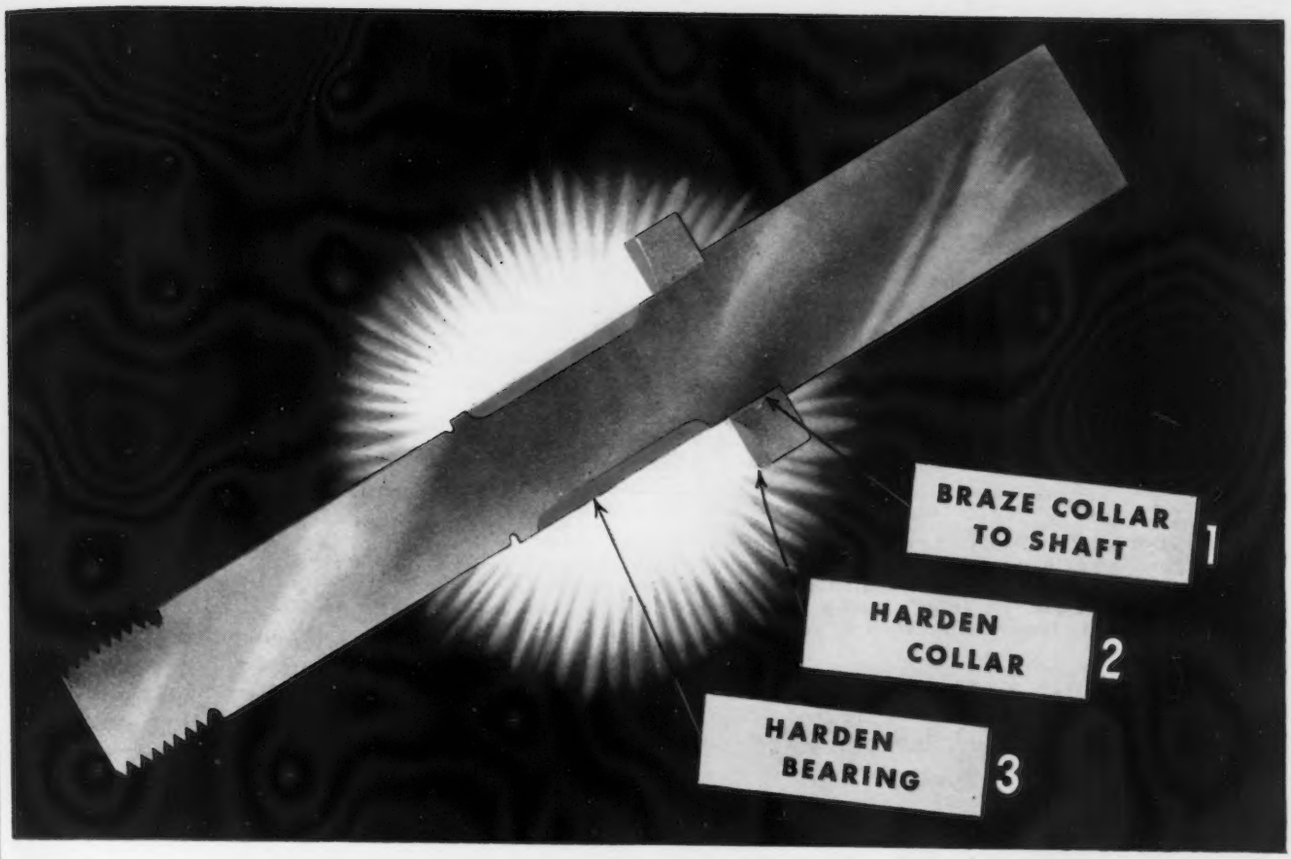
UNDERLYING cause of the WLB's difficulty in setting up a wage scale for the Coast plane plants which would be acceptable to workers, employers, and government stabilization agencies alike, lies in meeting a blanket agreement between principal Coast shipbuilders and unions inaugurated prior to the War and later modified to bring the basic journeyman's wage to $1.20 per hour. This agreement served as a model for similar agreements among the shipbuilding industries on the Atlantic and Gulf Coasts.

These shipyard rates to a great extent formalized existing standards in northern California and the Pacific Northwest, but meant that in southern California shipyard workers were to receive somewhat higher wages than those to which they had been accustomed. Aircraft wage rates in southern California, where all the airframe manufacturers except Boeing are located, never kept pace with this shipyard scale. Partially this was due to the aircraft industry's ability to utilize untrained workers and women and thus draw upon a then abundant pool of unskilled workers. As this labor pool gradually evaporated, the aircraft workers were able to bring pressure to bear for a more attractive scale. In southern California the usual starting wage is 60c per hour (as compared to 95c in the shipyards) with raises each four weeks until 75c per hour is reached. Thereafter the rates vary widely according to job classification, which is an important feature of the current controversy. The rates in the Seattle district are slightly higher.

For the California aircraft and parts industry as a whole, state Division of Labor Statistics figures show the average hourly earning was 96.6c per hour in December 1942 as compared to $1.326 per hour for shipbuilding and repairing, and $1.131 for all durable goods manufacturing industries.

By the time Paul R. Porter, ace WPB and WLB labor stabilization mediator, had the problem of setting a uniform scale for the aircraft industry tossed into his lap early last summer, the discrepancy with wage rates paid in the shipyards already was causing emigration from the plane plants. Already, however, opposition to any mass wage raises which might stimulate inflation nationally had become so strong within the Federal government that it was manifestly impossible to bring the aircraft rates to a par with ship building. Thus, Porter found himself wrestling with a Frankenstein's monster of his own creation, for he had received much of the credit for achieving with amity the sky scraping shipbuilding industry agreement the previous year.

ALTHOUGH Porter had an extremely liberal background, from the beginning of negotiations last July he made it clear that the scale demanded by the unions, based upon a 95c per hour beginning wage, would not be acceptable to the government. When the OPA representative echoed his words, the July meetings broke up, and negotiations were not resumed until the War Labor Board took jurisdiction and appointed a panel, again headed by Porter, in October. These hearings were conducted behind closed doors with a great deal of hush-hush, although they presumably involved public business. A proposal from Boeing went virtually all the way in beat-



3 Jobs in 1 Operation Completed by TOCCO in 41 Seconds!

THE versatility of TOCCO Induction Heat-Treating is shown by its application to Diesel engine balancer shafts. In just 41 seconds, a 80 K.W. TOCCO unit performs these three treatments simultaneously:

1. **Brazes thrust collar to shaft.**
2. **Heats and quenches thrust face of thrust collar to hardness of 56-58 R.C.**
3. **Heats and quenches bearing surface next to thrust collar to hardness of 45-55 R.C.**

Cross-sectional drawing of this treated portion of the 1½" shaft is shown above. Thrust collar formerly was upset on the shaft. The simplified design made possible by TOCCO cuts costs and conserves vital man-hours.

By a simple change of work fixture, the standard TOCCO unit that now speeds war production can be adapted to low-cost heat-treating of peacetime products. Investigate TOCCO for *your* present and post-war problems.

THE OHIO CRANKSHAFT COMPANY
Cleveland, Ohio

TOCCO

World's Fastest, Most Accurate Heat-Treating Process

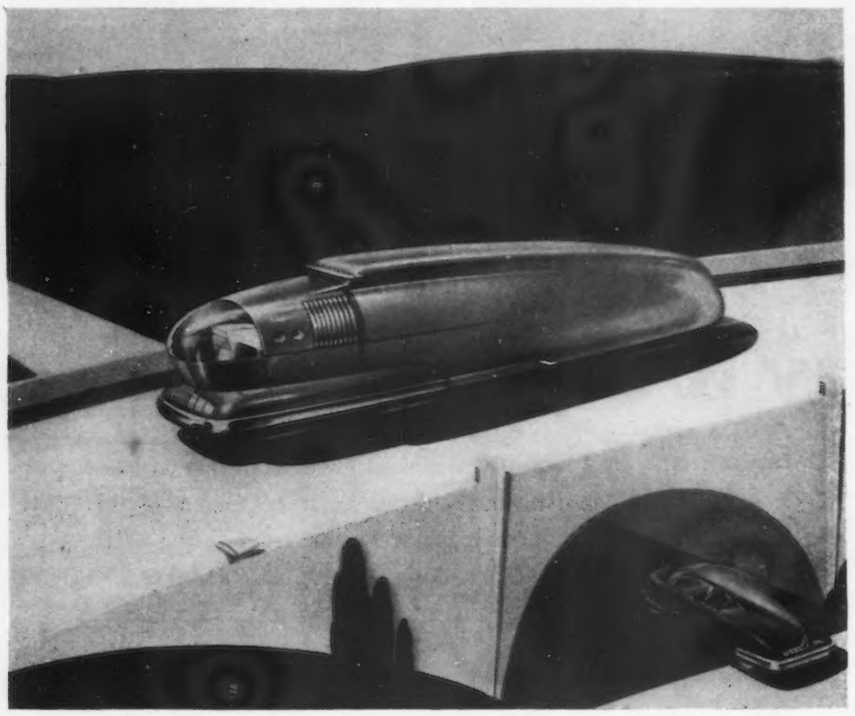
HARDENING
ANNEALING
BRAZING
HEATING for forming and forging

ing union demands. Following these hearings, Porter and his panel went into executive session and finally, weeks later, emerged with a recommendation to the National War Labor Board for base wage increases amounting to 5c. to 7c. per hour., juggling of job classifications, and escalator wage increases for service in a manner completely unsatisfactory to the unions. So strong were labor protests against the Porter recommendations when the National WLB received them in January, that they were not accepted by the full board. Labor men then were given to understand that the task of writing a new proposal was turned over to Prof. Paul Dodd, of the labor economics faculty of the University of California at Los Angeles and head of the new regional War Labor Board. As late as Feb. 17, the AFL was hopeful that Dodd would reject completely the Porter proposal and accept the union program, but word soon spread like wildfire that Dodd was blowing in the opposite direction and would make an even less acceptable proposal than Porter's.

From the union standpoint, desperation dictated that only direct action could possibly sway the board, since all arguments had failed. Union membership campaigns in such fertile fields as the yet unorganized Douglas plant had been based upon claims that substantially higher wages would be forthcoming and it was now up to organized labor to deliver the goods.

That is the background of work stoppage caused by union "meetings". Because aircraft plants in other parts of the country are not even remotely affected by West Coast wage stabilization, widespread sympathy strikes are unlikely. The union argument that its goal is merely to speed up a WLB decision is contradicted by the fact that whatever wage decisions are made will be retroactive probably through the entire second half of 1942. Attempted coercion of a Federal quasi-judicial body is a dangerous game, but the stakes are large.

A POST-WAR PRODUCT: Lurelle Guild, noted New York industrial designer, gives his conception of the "Transport of the Future." This is one of a number to be featured in advertisements of the Timken-Detroit Axle Co. Mr. Guild's work has been incorporated in many products ranging from refrigerators to railroad trains.



ELIMINATION of a bottleneck which prevented completion of Maritime Commission vessels by Consolidated Steel Corp. at Los Angeles harbor following launching of hulls, and which clogged outfitting facilities at that yard, was announced last week by that firm. Failure of an eastern manufacturer to make delivery of heavy propulsion machinery had raised havoc with completion schedules at the yard. Many more than a dozen hulls were launched but could not be brought to completion because of the eastern manufacturer's failure, before the situation was eased.

Complaints have been heard recently from northern California shipyards that quality of steel plates received from mills has deteriorated greatly from normal standards, particularly as regards sulphur content. One yard alleges that some plates recently received contained as high as 0.020 sulphur.

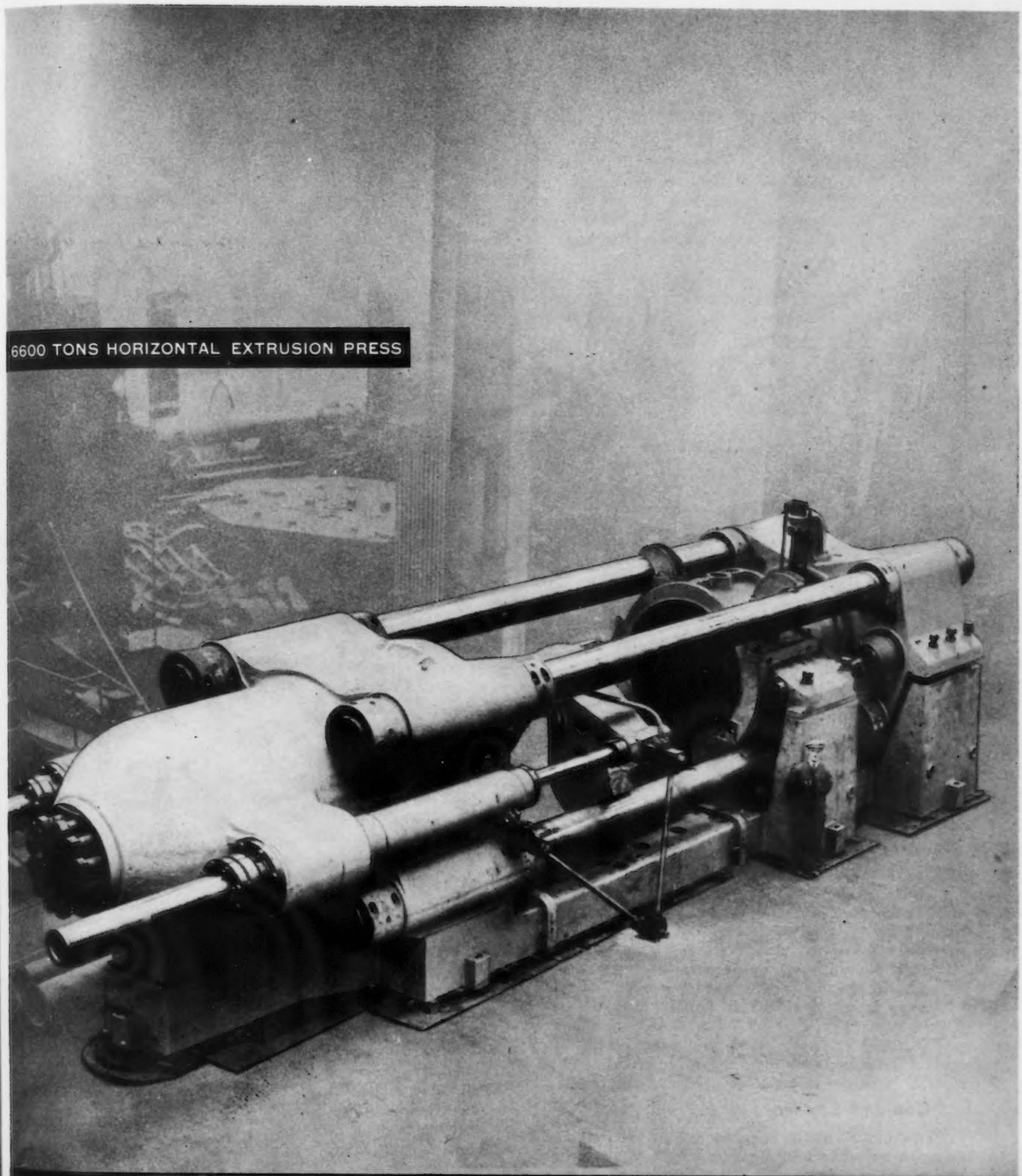
Current aircraft production difficulties revolve around securing small assemblies, electrical items, and miscellaneous parts from sub-contractors. This same obstacle loomed large a year ago, and still prevents the speeding up of production. Absenteeism in at least one plant (Northrop) has been running only 3.7 per cent, as compared to a peacetime average of 2 to 3 per cent. Thus, in at least one instance, this bogey man has been licked.

Huge Republic Expansion Tops Chicago Construction

Chicago

• • • **Industrial construction** in the Chicago area, either undertaken or authorized, during the first two months of 1943 represented an investment of $25,208,150, according to the Chicago Association of Commerce. With practically all of this increment designed for war production purposes, the total investment in new plant capacity here for war needs since the program started in mid-1940 has reached a figure of $843,863,150.

Largest of the construction projects authorized for the Chicago area in the past month was the $23,000,000 expansion of the Chicago plant of the Republic Steel Corp. It involves a major installation of rolling mills, blast furnaces and electric furnaces. This latest expansion brings the total Federal investment in this plant under the war program up to $79,000,000. Further enlargement of the Buick airplane engine plant at Melrose Park, to triple its output of airplane motors, was also indicated in the past month.



HYDROPRESS · INC.

ENGINEERS CONTRACTORS

HYDRAULIC PRESSES · ROLLING MILLS
PUMPS · ACCUMULATORS

570 LEXINGTON AVENUE · NEW YORK · N. Y.

Fatigue Cracks BY A. H. DIX

Mineral Oil vs. Compound Cathartic

• • • Our guess is that, in the form of woodpulp, the paper used in the next three months to print what is written on absenteeism would be sufficient to float the 45,000-ton *Iowa*. Of course, 90 per cent of it will be hogwash, like the beautiful full-page ads the Peace League used to run in the early '30s, bemoaning war but not tackling the causes of it.

This neutral 90 per cent will be contributed by newspaper editorialists, general magazine writers and others with a piddling knowledge of the subject, but who feel obligated to come out against it as Calvin Coolidge's minister did against sin.

The remaining 10 per cent, the only part with power to do much good or harm, is that aimed directly at plant personnel. Ideally, the writer of anti-absentee propaganda should work in the shop at least a full month for 10 hours a day, seven days a week, in order to get what advertising writers call "the consumer angle." For obviously you can't write convincingly to people unless you know what makes them tick.

But in the absence of a spell of 70-hour weeks as a proper approach to the absentee problem, we recommend a reading of the report prepared by the entire IRON AGE field staff, and printed in our Feb. 11 issue. This is, in our biased eyes, the most thorough, fairest study yet made of absenteeism.

It will help the student diagnose the disease, locate its causes, and prescribe the cure. As the student's knowledge grows he will learn the fallacy of supposing that any kind of anti-absentee medicine is better than none at all. He will find that the harsh, abrasive kind, prepared by someone with vast enthusiasm but little knowledge of the "customer's" problems, quirks, and I.Q., may injure delicate employer-employee membranes, and that its use might be compared with treating dandruff with applications of carbolic acid.

The customer, who is in this case the factory worker, may have had to take a day off to see about a persistent bellyache, caused by having to eat his big meal at 7 a. m., and a reflection on his patriotism is only going to make him sore, especially if he, too, has a boy in North Africa.

Generally speaking, mass dosages of anti-absentee propaganda should be of the mineral oil variety. Only in extreme cases should every employee be obliged to take a swig from the castor oil bottle.

Before writing the prescription that best fits your needs, we suggest that you re-read pages 95 to 102 in the Feb. 11 issue.

They Couldn't Say No

• • • Few of us like to be preached at. Persuasion is much more effective and pleasanter to take. Of course, everyone knows that, but good, thumping sermons, orally or printed, continue to be popular among sermonizers, probably because of the satisfaction they give the sermonizer. He knows he could make many more converts by toning down the act, making a few concessions, and genuinely trying to influence his audience, instead of merely putting on a good show.

But if he employed persuasion he would be deprived of the satisfaction of knowing that the persuadee realized he was influenced. That takes the fun out of it. Some, however, are willing to take the cash and let the glory go. Take, for example, the case of Alfred Yerden, alias "A. Moore," the Midwestern subscription impostor. Until his career was temporarily halted by a jail sentence, Alfred was persuasion personified. Armed only with a courtly, quiet manner and a pad of fake receipts, he persuaded numerous manufacturers to part with sums ranging from $10 up to $55.

Flowers That Bloom in the Spring

• • • "Moore" was persuasive even in print. Listen to this from Miss Ruth L. Rosen, of the Steel Terminal Co., Detroit:

> Perhaps it is because today there's a first, faint whiff of Spring. But whatever the reason, I hereby lay aside storage reports and dull routine to tell you what magic you have brought into my spinsterish, secretarial existence. You have brought me A. Moore!
>
> How am I to concentrate on weights and sizes, dates and priorities, when at any moment right into this drab office may walk the bespectacled, well-mannered, soft-spoken, suave A. Moore? What Moore can a girl ask? Charm, gentlemanliness, and success. If he comes around here, boys, just clear the way!

We are glad for Miss Rosen's sake and for others that Prince Charming is now in stir, for no one could say him no. But fear rather than admiration is our reason for continuing to feature him here week after week. What we are afraid of is that the 90-day anneal he is now getting in the Detroit House of Correction will not be sufficient to remove the stresses and strains acquired over three decades. If May does not see him blossoming out with the spring flowers, under another name and in new pastures, our faith in human nature will shoot up to room temperature.

Stopper

• • • "God help me if this is a dud"—*American Steel & Wire Co.*

Now It's Centimeters

• • • We always have trouble with kilometers, liters, knots and other unusual units of measurement, and bless the writers who take the trouble to follow up with a parenthetical "That's so many yards, quarts, miles or acres." Millimeters no longer bother us, as we have accustomed ourself to dividing by 25 and saying to ourself, "That's so many inches."

But now that we are at home with millimeters the brains department crosses us up with a new one. Maybe you saw this caption in last week's issue, "NAZI WEAPON: A new model German armored 15-cm. gun. . ."

If they ran out of millimeters and had to start using centimeters, the new gun, we thought, must be a big buster. But we see from the tables in the back of our drug store dictionary that it is just the 150-mm. (6-incher) stated another way. As you knew, and we forgot, 10 millimeters make a centimeter, and if the brains department wants to bewilder the customers some more it can divide by 10 again and call it a 1.5-dm.

Birth Date Eternal

• • • Speaking of change, this comes from Ralph (G-E) Farnham, via "The Advertiser's Digest":

A purchasing agent who wrote a supplier for a new catalogue received this reply, "The only part of our catalogue we are still certain about is the line that says 'Established in 1885.' *All other information and prices have been withdrawn."*

Puzzles

The answer to last week's projectile problem is $1.03527344 C^3$.

If you can do this one in your head in 35 seconds or less, you are smarter than the Quiz Kids:

If a man 6 ft. tall walked around the equator, how much farther would his head travel than his feet?

They Speak a Language the Japs Understand

FIRE ONE! FIRE TWO!

From the first day of this war, the crews of U. S. submarines have thus "reasoned" with the enemy—and in his own waters.

They know *action* and *engines*—for they literally live with and by the Diesels which take them there and bring them back.

Many of these Diesels are Fairbanks-Morse Diesels. We feel that nothing short of our level best is good enough for these men of the silent service.

FAIRBANKS, MORSE & CO.

Dear Editor:

M-3 DID IT

Sir:

Our attention has been called to an illustration on page 30 of your Feb. 11 issue, showing the M5 tank produced by the Cadillac Co. and underneath the caption stating that "The M5 tank has been given a good share of the credit for the British drive which routed Rommel across Northern Africa."

For your information, records prove that all American light combat tanks in the British service in North Africa are M3 light tanks made by this company.

Recently a new light combat tank appeared in Africa with the American forces.

J. M. REIBEL,
Advertising Manager
American Car and Foundry Co.,
30 Church St., New York

CASTINGS FROM LOW GRADE SCRAP

Sir:

I have charge of the instruction of a national defense training class in foundry work at the Central Colored High School, Louisville, Ky. For the past two years we have not been able to secure anything but low grade scrap cast iron because of the war emergency. Our trouble has been due to the fact that the castings were so hard and brittle they resisted the hack saw, the file, the drill, etc. As a result of this difficulty, I tried a series of experiments that have obtained very satisfactory results and I am passing it on to the industry for what it is worth because I imagine other foundrymen can use it, if they happen to have the same difficulty we have had.

First, we experimented with mixing the coke with lump charcoal. I made the usual base charge of coke, then some unmeasured charcoal and noted a slight improvement in the castings. Next we tried the same base charge of coke, added some charcoal, then 100 lb. of iron to the usual 10 lb. of coke mixed with charcoal. The improvement was more encouraging. Next we tried a 50-50 coke and charcoal mixture throughout the cupola load and results were excellent. We have used this method five times in a row and results are very satisfactory in each instance. We find this method very economical and simple.

My theory is that when iron melts and passes through the charcoal, it absorbs the carbon in the charcoal and regains a considerable content of the carbon it has lost in previous meltings. We find that it regains its tensile strength in a satisfactory degree, has a good color, pours in a smooth, fluid stream even when poured in a heavy sand mold. Whatever the scientific theory may be, the experiment works. Some of the charges we have tested have been melted over as many as three times and was scrap to start with.

M. E. BROWN
Central Colored High School,
Louisville, Ky.

GLASS GAGES

Sir:

Your article on Glass Gages in the Feb. 4 issue is complete both from the matter of technical information supplied, and from the point of interest. We are most anxious to either secure your permission to reprint this article for classes in inspection, or to secure reproductions, if they are available.

RALPH C. MALICK,
Assistant Director of Engineering Extension
Pennsylvania State College,
State College, Pa.

• You have our permission to reprint it.—Ed.

Sir:

I am very much interested in procuring a copy of the article by F. J. Oliver, entitled "Glass Gages." Can you suggest where I may obtain one?

W. PATRICK,
Chief Tool Inspector
Curtiss-Wright Corp.,
Buffalo, N. Y.

• A reprint has been mailed.—Ed.

TURRET PUNCH PRESS

Sir:

Will you please send us a reprint of the article entitled, "Layout Tables Speed Work on Turret Punch Presses" by Theodore A. Wiedemann, in your Feb. 18 issue, page 47.

EDWIN KUSSMAUL,
Factory Manager
Metropolitan Electric Mfg. Co.,
West Warren, Mass.

PLASTIC MOLD

Sir:

Some months in the past you had an article entitled, "Capaco Plastic Mold Process." Will you please advise us when this appeared and where it can be secured?

F. M. PETERSON,
Supervisor Mfg. Research Div.
Consolidated Aircraft Corp.,
Fort Worth, Texas

• The article "Plastic Molds" by W. A. Phair, appeared in the issue of Oct. 9, 1941. Reprints were made and a copy is being sent to you.—Ed.

SURFACE FLAW DETECTION

Sir:

Please send me a reprint of the article by Greer Ellis entitled, "Detecting Surface Flaws in Non-Ferrous and Non-Magnetic Materials," which appeared in your issue of Dec. 17, 1942.

ROBERT KATZ
Materials Lab.,
Wright Field,
Dayton, Ohio

• Reprints were not made, but a clipping is being sent you.—Ed.

ABSENTEE CONTROL

Sir:

The cover of the Feb. 18 issue is most interesting. It has a definite appeal to the absentee which I feel would be very effective in connection with our absentee control program.

I hereby request your permission to enlarge this cover five or six times and use it as an Absentee Poster.

BEECHER B. WILLIAMS,
Supt.
W. H. Nichols & Sons,
Waltham, Mass.

Sir:

We were very much impressed with the front cover sheet on your magazine issue of Feb. 18, showing the American Flag and a little note on absentees.

We would like very much to obtain three or four copies of this pictorial and are wondering if you have any of these on hand or can advise us where we can obtain them.

M. TRAUM,
Vice President
Sacks-Barlow Foundries, Inc.,
Newark, N. J.

Sir:

The cover on your Feb. 18 issue is one of the best we have ever seen on absenteeism. "On Deck" hits the "bull's eye." If by chance you have made copies of this timely message and intend to send them out, please include us in your list.

W. A. DeVETTE,
Personnel Director
Muskegon Piston Ring Co.,
Muskegon, Mich.

Sir:

We have had a request from a customer of ours, the Automatic Sprinkler Co., to make reproductions of the cover "On Deck" that appeared on your Feb. 18 issue.

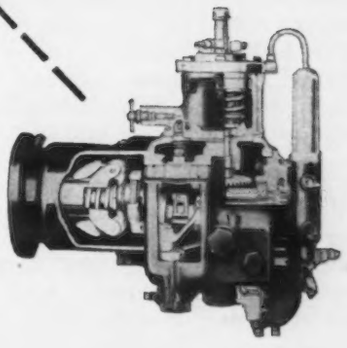
They were very much impressed with the idea it conveyed and would like to have posters made to place throughout their factory and offices. We would appreciate having you extend us the courtesy to make the reproductions.

BEN EVANS
Beil and Evans Co.,
Youngstown, Ohio

• F. H. Hastings, of the New Britain-Gridley Machine Div., New Britain Machine Co., New Britain, Conn., writes, "The demand for reprints of this advertisement has been such that it appears we will require a considerable number of reprints. It may also interest you to know that we have had several requests for enlargements of this in poster form, and that we are planning to enlarge the advertisement to make the poster size."—Ed.

SECRET POWER FOR WAR-TIME DIESELS!

★ The tremendous power of modern diesels depends upon many hidden features. In the combined fuel pump and governor unit of the Cummins Engine, for example, are several especially designed springs. These springs, fabricated by Muehlhausen, are to a large extent responsible for the smooth performance of the engine under greatly varying loads. They help to provide the sudden bursts of power required as a huge shovel bites its way through mountains—or the steady flow that enables multi-ton trucks to churn through the gumbo of wilderness roads. If your product has a tough spot for a spring of any type—compression, extension, torsion, or flat—consult MUEHLHAUSEN SPRING CORPORATION, 650 Michigan Ave., Logansport, Indiana.



MUEHLHAUSEN SPRINGS

EVERY TYPE AND SIZE

FREE! SEND FOR INFORMATION

- New Die Spring Bulletin illustrates, describes 206 sizes and types of die springs.
- New Armament Bulletin shows importance of springs for many types of war equipment.

This Industrial Week . . .

- ***Vital Production Continues High***
- ***Plate Inventory Situation Analyzed***
- ***Bessemer Process in Spotlight Again***
- ***Ingot Output Remains at 100 Per Cent***

INDICATIONS are clear that the all-out war effort of the metals and metalworking industries continued unrelenting in February. Several individual steel mills very nearly succeeded in filling a 31-day-month schedule in the 28 days of February. Ingot production this week continues at 100 per cent. The machine tool industry's effort to supply customer needs despite manpower shortages is indicated by the Warner & Swasey Co. report that turret lathe shipments in the first two months of this year set an all-time record.

Extreme pressure probably will be put on steel mills for new production records in March, especially in regard to plates, bars, sheets and tubular products, all in heavy demand for war purposes. March may prove to be equally as important a production month as May, which traditionally is the industry's peak for the first half.

The alloy steel situation still is critical and it is understood authorities are reviewing specifications for mild alloy steel in an effort to substitute carbon steel wherever possible. Tinplate mills face a busy second quarter as a result of releases this week. Barrel stock continues in heavy demand. All told, February steel order volume in the aggregate was ahead of actual industry shipments.

Output of steel plates in March may reach 1,200,000 tons. The industry could produce as high as 1,500,000 tons without difficulty, but only at the expense of heavy hot rolled sheet output which is needed badly. Some persons at Washington have hinted that too many plates might be on hand at shipyards in comparison to launchings. One of the factors which appears not to be fully appreciated is that numerous new shipyards are scheduled to come into operation and necessarily have been ordering and receiving plates well in advance. Shipbuilders like other industries have "lead time" of several months.

WHILE the Maritime Commission recently has not taken as much plate tonnage as in some other months, total plate output has remained unchanged because Army and Navy requirements have been stepped up. There are some who believe the services are ordering more plates than actually needed in a given space of time. The Maritime Commission is said to have no more than 60 days' supply on hand and may have even less than this, but it is pointed out that this represents unfabricated tonnage. A plate that merely had some holes punched in it would come under the classification of being fabricated.

It is expected that a solution may be reached, insuring shipbuilders of a steady flow of plates, plus a reasonable inventory. At the same time, sheets are getting as tight as plates and may become tighter as plate output increases.

A bottleneck clogging a West Coast shipyard with more than a dozen hulls which were launched but could not be brought to completion, was eased last week when delivery of machinery from the East was improved. Meanwhile, it became known that the Maritime Commission is redesigning the Liberty ship to give it greater speed and longer life. In this connection, boiler tube orders have been heavy and specifications have been altered.

THE growing importance of alloy steel in warfare has been recognized by the setting up of an Aircraft Alloy Steel Section in WPB's Steel Division for the purpose of helping speed deliveries of certain alloy products to aircraft plants, and handle aircraft alloy steel requirements. In making the announcement, WPB disclosed that alloy war requirements are estimated at about 17,000,000 tons annually. As pointed out a few weeks ago, a study of the aircraft alloy situation has been completed by the Steel Division in collaboration with the Aircraft Scheduling Unit and metallurgical, production, distribution and statistical experts from the steel industry. Production of alloy steel ingots in January amounted to 1,260,000 net tons.

The steel industry's addition of 1,627,490 net tons of ingot capacity in 1942 (nearly 1,100,000 tons being added in the last half of the year) does not entirely represent strictly new facilities. A large portion of the gain arises from operating improvements, rehabilitation and expansion of facilities which have long been in operation. A small dip in bessemer capacity was reported, bringing this old and often misunderstood process into the spotlight again. Practically all bessemer converters in the nation capable of producing blown metal have been working at top capacity for months. What is not used as bessemer ingots has been consumed by open hearths either as scrap or for partial or complete duplexing operations. It is likely that a score or more of new bessemer applications, including several for the armed services will be given consideration soon.

IN accomplishing their phenomenal transportation record, the railroads in recent months have been wearing out equipment rapidly and nearly have exhausted their cushion of spare freight cars. The

News Highlights in This Issue

Bessemer Steel	95	DPC Contracts	130
Carbuilding Expedited	97	Scrap Labor a Problem	134
Making Bombers Faster	100	Priorities News	138
Coke Supply Tightens	104	Prices	151
Firms May Lose "E"	106	CMP Scheduling	159
Labor News	123	Machine Tools	162
Bonds for Attendance	124	Non-Ferrous Metals	164
Rules Threaten Shipping	126	Scrap News	166

riers originally asked for about 80,000 domestic cars for the year 1943, and the WPB finally countered with approval of 20,000 cars in the first half of this year. It turns out that the cars will not be completed entirely until late this year, due to the retarding influence of low priorities. Unusual initiative immediately on the part of all persons concerned with the problem appears to be necessary, with perhaps a restudy of requirements and priorities.

At an important Mid-West war center some manufacturers have been complaining more vociferously about steel deliveries and interruptions in manufacturing schedules. In some cases, shipments are found to have been delayed by directives or emergency shipments which upset steel mill schedules. Undoubtedly much confusion exists.

CMP regulations have been amended to make operations of the plan conform to scheduling procedures which have been set up at WPB for the purpose of breaking production bottlenecks in critical components. Order M-293, issued last Saturday, calling for the scheduling of critical components, is expected by some persons to boost production as much as 20 per cent. The order is not new in principle.

Of all developments of the past week, growing labor unrest, evidenced in the West Coast airplane industry and in the important aluminum airplane forging plant at Cleveland probably occupied the attention of industrialists above other matters. Even in the steel industry, some persons are uneasy over the growing number of complaints from labor and other factors.

WORRY over the scrap supply picture has subsided for the time being at least although continued dwindling of scrap yard labor could easily turn a comfortable situation into a short one. Furthermore, supplies may not be balanced geographically, which might require some redistribution. The balance and outlook have been based on alloy steel turnings, which are now overabundant and are causing headaches for steel mills, since the government is pressing for greater consumption of turnings while important buyers hesitate to relax their specifications in order to permit the use of steel which the turnings may cause to be a few points higher in analysis.

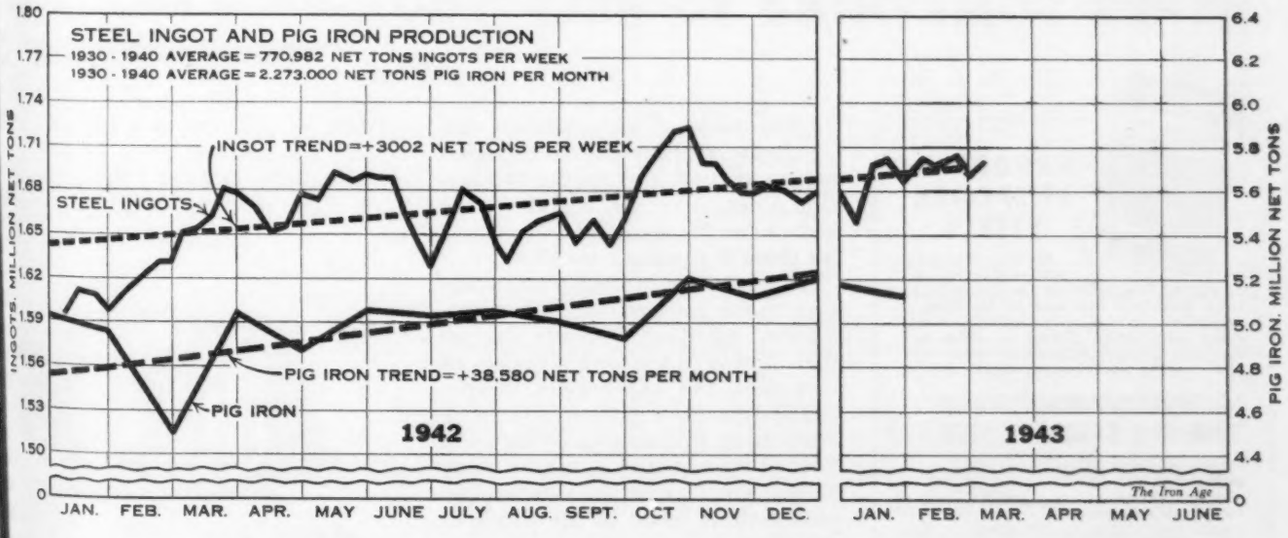
Currently, production of industrial scrap is larger than expected while dealer scrap is declining slowly. Some persons hold the opinion that when additional new steel capacity comes into operation later this year, a temporary tightness or shortage may develop.

More Speed Sought for Liberty Ships

Washington

• • • Looking to its use by American operators for peacetime competition, the Maritime Commission is redesigning the Liberty ship so as to give it greater horsepower and speed as well as longer life. To this end the present reciprocating engine is being redesigned and certain structural changes are being made. While at present the new design is in the blue print stage, the changes to be made are relatively simple, making it possible to get construction under way soon. Originally the Liberty ship was designed as an emergency vessel that ostensibly would be good for only about five years' sea service.

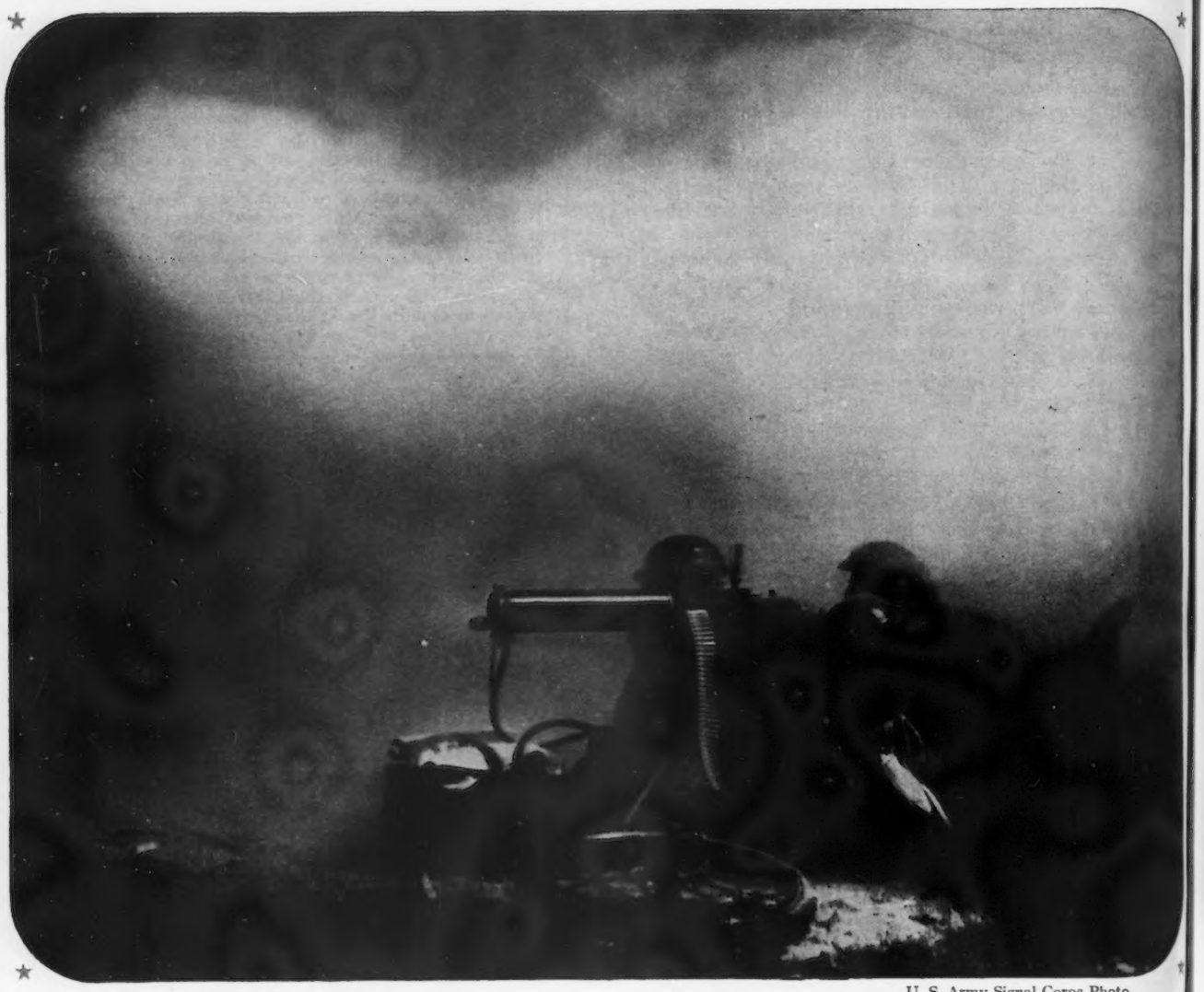
WITH national steel ingot production continuing at 100 per cent of rated capacity, operations at Pittsburgh are up half a point to 101.5 per cent and at Buffalo output is up one and a half points to 106 per cent. Wheeling has gained a point to 88 per cent and Birmingham has increased production five points to 102 per cent from last weeks revised figure of 97 per cent. Up one and a half points is steelmaking in Detroit to 106 per cent from last weeks revised rate of 104.5 per cent. Eastern district operations have jumped seven and a half points to 112 per cent. Declines this week are in evidence in Chicago where the melting rate has sagged half a point to 101 per cent, in Cleveland where output is down one and a half points to 95 per cent and in Philadelphia down half a point to 92.5 per cent. Unchanged from last week are the rates at Youngstown at 101 per cent and Cincinnati at 105 per cent.



Steel Ingot Production by Districts Per Cent of Capacity

Week of	Pittsburgh	Chicago	Youngstown	Philadelphia	Cleveland	Buffalo	Wheeling	South	Detroit	S.Ohio River	West	St. Louis	East	Aggregate
February 25	101.0	101.5	101.0	93.0	96.5*	104.5	87.0	97.0*	104.5*	105.0	102.0	104.5	104.5	100.0
March 4	101.5	101.0	101.0	92.5	95.0	106.0	88.0	102.0	106.0	105.0	102.0	104.0	112.0	100.0

* Revised



U. S. Army Signal Corps Photo

HERE'S SOMETHING TO HELP YOU *Clear the Air*

HANDBOOK OF SPECIAL STEELS

Newly revised and reprinted—a comprehensive book on the properties, uses, and best methods of handling, treatment, etc. of tool, stainless and other alloy steels. Plenty of tables to facilitate quick reference and selection. 128 pages, pocket-sized, latest data.

ELEMENTARY DISCUSSIONS: TOOL AND STAINLESS STEELS

Informative booklets giving clear, detailed data on the various types of tool and stainless steels, their properties and handling. Excellent for training courses in metals and metalworking.

THE lack of information can throw a pretty effective smokescreen around jobs on the production lines. After all, it's about the same as on the firing line—you can't hit them if you can't see them.

Your plant is probably no exception to the general run of war producers. All have a steady job on their hands of training a stream of new men and apprentices in specialized machine operations or other fabricating procedures. Where the needed information concerns alloy steels, you'll find invaluable the publications listed in the panel to the left.

They're primarily for production men. For engineers and designers, complete and certified technical data on the various types of stainless and tool steels is available in Allegheny Ludlum "Blue Sheets."

● Write for the help you need.

ADDRESS DEPT. IA-2

AL

STEEL FOR THE NATION'S WELFARE

Allegheny Ludlum

STEEL CORPORATION

BRACKENRIDGE, PENNSYLVANIA

A-8836 . . . W

Bessemer STEEL

Old Process, Often Misunderstood, Now Seen Gaining a Stronger Hold

Pittsburgh

• • • **Pampered by those** who make it, slighted by those who do not make it, misunderstood by those who should use it, and unappreciated to its fullest extent by governmental agencies, bessemer steel through the impetus of war times is slowly gaining a stronger hold on itself and steel production in general.

The whole question of what bessemer steel is, what it can do, when it should be used, and what real part it can play not only in the war effort, but in the future, is almost hopelessly confused by a maze of prejudice, misinformation, lack of impartial research studies, and just plain out-and-out ignorance of the overall picture. Despite all this, there have been definite signs recently that more bessemer steel will be used, and that it will be used in many different applications and will probably take a new and firmer lease on life.

With deoxidation and dephosphorization meeting considerable success and with the question of desulphurization fairly well licked, efforts in the near future will be directed towards minimizing the content and controlling the alleged effect of nitrogen.

Stated simply, without technical jargon, the belief has always prevailed that bessemer steel should not be used on any application requiring cold working, such as forming or deep drawing. While this warning is probably only partially substantiated by the facts, the mere mention of it seems to put a black mark against bessemer steel regardless of the application. This opinion is borne out by the attitude of the armed forces on the use of bessemer steel after the United States entered the war.

Before the war, approximately 40 per cent of cold finished steel bar production utilized bessemer steel. Private enterprise, following years of trial and error, as well as closely controlled studies, had discovered those qualities in bessemer steel which resulted in such a high percentage of applications in the cold finished bar field. However, when the Army and Navy moved in with specifications for their materials, the participation of bessemer steel in cold finished bar output dropped in some cases to 25 per cent and in others to as low as 18 per cent. After long arguments, conferences, some people were brought around to the point where a more liberal attitude was shown. In recent weeks, it is estimated that the participation of bessemer steel in cold finished bar products has risen to about 35 or more per cent. Impartial experts on the matter, however, believe that about 60 per cent of the cold finished bar business, especially during present war times, could be made from bessemer steel without taking chances on quality or performance.

Some people would like to think that the bessemer situation resolves itself down to a fight between those who make it and those who don't make it. This frame of mind, which obviously is not based on fact, causes useless suspicion which, in the last analysis, prevents the full utilization of the nation's steel capacity and production. The simple purpose in advocating the use of bessemer steel wherever possible, is at the present time at least, for the purpose of relieving open hearth facilities and production for those cases where open hearth is definitely required. There are even some cases, according to unbiased steel people, where bessemer steel could be used to a greater advantage than is now the case. There are those just on the border of prejudice who foresee a definite rebirth and small but steady growth in the production and utilization of bessemer steel.

The most often repeated statement, which, although untrue, has been said so much that it is accepted as true, is that bessemer output is only being carried on at 80 or 82 per cent of capacity, or that bessemer steel only constitutes about 6½ per cent of total steel production, or that there are so many million tons of bessemer steel capacity not being used. Practically all bessemer converters in the country capable of producing blown metal have been working at top capacity for months. (See THE IRON AGE, Jan. 7, 1943, page 87.) What is not used as bessemer ingots has been consumed by the open hearth furnaces either as scrap or for partial or complete duplexing operations. In 1942, it is estimated that about 45 per cent of bessemer blown metal was consumed in

the form of bessemer ingots, with 55 per cent going to the open hearth furnace either as scrap or for partial or complete duplexing. In other words, about 14.3 per cent of the total steel produced in 1942 owed its origin to bessemer blown metal, with 6½ per cent of the total representing bessemer ingots, and slightly less than 8 per cent representing blown metal going to the open hearth.

Contrary to general belief, the utilization of bessemer blown metal has been relatively stable with respect to total steel production for the past ten years or so. The war effort has increased participation recently and had it not been for the suspension of many orders outstanding for new bessemer converters, the percentage might have climbed much higher this year. Even though most bessemer converter projects have been suspended or cancelled because blowing equipment is more urgently needed elsewhere, the research on bessemer steel applications, the saving of valuable time by duplexing or partial duplexing, and the more liberal application of bessemer steel will undoubtedly mean a greater overall use of bessemer steel or metal this year. Whether or not such experiences will make an impression deep enough so that they can "swing their weight" after the war, remains to be seen. It can be said, however, on the basis of recent information, that the mechanics of converter operation may go through some drastic changes, at least, as far as the large bessemer converters generally used in steel mills are concerned.

There is a definite possibility that the side blowing technique used by foundries on small five-ton bessemer converters may be applied to the larger 25-ton units, in order to cut down the percentage of nitrogen in the finished blown metal. It may also be that converters might be built so that they could be either side blown or straight blown. If such experiments prove the success hoped for by its sponsors, the time may not be far distant when bessemer steel can take its place alongside of open hearth without its perennial handicaps, many of which are figments of the imagination.

One maker of crankshafts for years has used bessemer steel for this product. Not only has bessemer steel been used, but it has been alloy bessemer steel, which has withstood satisfactorily drop forging operations in producing the crankshaft. That the Army Ordnance has been slow to catch on to the possible uses of bessemer steel is indicated by the production of a lifting plug for shells made from a bessemer analysis. This project included drop forging which resulted in a 15 to 20 per cent increase in the forging die life. Actual tests at 40 degrees below zero were made on these lifting plugs with satisfactory impact results. Despite the fact that there was no cold work involved in the use of the lifting plug, Army Ordnance headquarters has consistently turned down this application. On the other hand, one of the ordnance districts *had* utilized two million of these plugs and found them satisfactory before the application was ditched by ordnance headquarters. Such an application of bessemer steel under present war conditions would mean faster delivery and would free open hearth steel for other purposes.

The WPB has only recently ordered railroad spikes to be made from bessemer steel. One company, manufacturing spikes, has been using bessemer steel for years. For several months, thousands of tons of sheets have been shipped out on lend-lease for barrel production with open hearth specified, despite the fact that bessemer could do the job.

Another increased use of bessemer steel involves the production of oil well casing with bessemer killed steel. A large Pittsburgh pipe plant is said to have made as much as 100,000 tons of this bessemer killed steel pipe with very satisfactory results.

Case after case like these above could be cited, but it all boils down to the fact that those in charge of directing the application of bessemer, as well as the customers who are to use it have been handicapped either by a lack of sufficient information about bessemer steel or else by the human difficulty of getting rid of prejudices.

It has finally taken a major war to furnish a chance for bessemer steel to show what it is worth. Considerable talk has been going the rounds that with a greater number of blast furnaces more bessemer blown metal would be available. This is not entirely true, however, because many of the new blast furnaces to come in are not located near bessemer plants. Also the suspension of orders for new bessemer converters will have its effect.

Obviously, those who are not equipped with bessemer plants will not rush into bessemer production either now or after the war. The same thing holds true for steel companies which do not hold large or long time ore contracts. Nevertheless, many steel companies today refrain from talking about either bessemer or duplex steel when they are using large quantities of bessemer blown metal in their open hearths every day in the year. There are definite technical and research signs that it will regain an important place in steelmaking practices and be utilized where it will do the best job.

Ways in Which Bessemer Steel

• • • That readers may better appreciate Bessemer applications, THE IRON AGE publishes the following lists, which are believed to comprise a fair and representative picture of uses and possible uses. Future applications which are in the realm of possibility, according to experts, are classified separately. There is no indication at this time whether approval will be given for some of the military uses suggested here, but it is believed likely that consideration at least has been or will be given to the subject.

Representative Established Applications

Alemite fittings; barrels for rifles and shotguns; anchor bolts; carriage bolts; beer can bodies; valve spring caps; commutator parts; cooperage parts; seamless coupling; hay loader crankshafts; hose fittings; generator frames; jack handles; auto fan hubs; agricultural implements; clinch nuts; conduit pipe; printing press parts; radio parts; lightning rods; pump, tie and truss rods; window sash; shafting; lawnmower supports; locomotive staybolt caps; switch parts; wheelbarrow tires; fire door tracks; juvenile vehicle parts; washing machine parts; cold drawn wire.

Might Be Applied More Widely

Where Open Hearth or Bessemer Might Be Specified

Air preheaters; arches for trench covers; barges; bread pans; concrete bars; cargo truck bodies; ammunition boxes; open hearth charging boxes; ship bulkheads; cabs for cranes; railroad car materials; hose carts; coal conveyors; annealing box covers; gear covers; bomb crates; air conditioning ducts; auto engine parts; parts for fans; fences and fence posts; locomotive side frames; funnels; metal furniture; generator parts; hardware; ammunition igloos; lunch boxes; lockers; loading equipment; machine parts; mufflers; truck tire racks; pumping equipment; sand blasting equipment; shovels; skylights; textile machinery; truck trailers; perforated wire cloth and mesh.

Applications Deemed Worthy of Consideration

Boat scrapers; bomb parts; building hardware; building material; chain side links; farm and garden tools; floor plates; small forgings; grinding balls and rods; parts for field guns, howitzers, etc.; hammers and hatchets; kitchen equipment, including that for Army kitchens; equipment; landing mats; milled nuts; piling; seamless tubing; secondary strength members for boats and landing craft; certain shell components (not including bodies); certain sheets for Army specifications; trench mortar shells; tank parts; tie plates; railroad spikes; welding machinery; wire products; wire screen; fish plates.

Initiative by Railroads and ODT Needed to Expedite Carbuilding Program

Pittsburgh

• • • **The railroads,** with the complete cooperation of their shippers, have done such an unprecedented job of moving the nation's freight and passengers that this accomplishment alone has fostered the opinion in government circles that the railroads could be by-passed continually in the matter of material and equipment.

As long as there was no acute shortage of cars, the pleas of the railroads for substantial carbuilding programs either went unheeded or were only partially provided for. The argument presented by the WPB and other governmental organizations usually took the same course—that steel and other materials were needed more urgently for guns, ships, etc. Overlooked and still not given the proper perspective is the simple fact that without the necessary freight carrying and locomotive capacity, armament supplies and ships will to some exent be neutralized.

In recent months the railroads have about used up all their rope and the cushion usually represented by surplus cars has been "worn to a frazzle", and practically no longer exists. Three major factors bringing about this condition have been: delay in producing new freight cars and locomotives, an increase in the number of wrecks which have forced cars and locomotives out of service, and the sudden and periodic demand for cars and locomotives as a result of concentrating troop and war material movements.

Other secondary factors which have tended to accentuate and are helping to bring to a head the entire railroad problem are—**inability of the railroad** to give the proper servicing to cars and locomotives owing to urgent need for this rolling stock, the red tape which has to be gone through in submitting car programs for approval, and the inability of carbuilders and railroads to obtain the various types of steel products and other components in a steady flow so as to complete freight car construction in the minimum amount of time.

The railroads originally asked for approximately 80,000 domestic freight cars for the year 1943, and the WPB finally countered with an approval of 20,000 cars for the first six months. They will not be completed before the second half of 1943. Some authorities say that the railroads will get no more than 20,000 for the second six months, although some believe 40,000 may be allocated. Even if the railroads had been overly optimistic in their demands, it is hardly probable, according to railroad authorities, that they would overshoot the mark by 100 per cent.

It is true, according to reliable sources that the shipbuilding program and other direct war projects are taking products which otherwise could be utilized for freight car construction, but even among governmental people there are opinions held to the effect that perhaps shipyards are obtaining more plates, shapes, and bars than they can handle within a given space of time. On the other hand, if the

Railroad Freight Car Program at a Glance

• • • **Breakdown of** officially approved domestic carbuilding program for the first six months of 1943 by builders and number of cars involved:

Carbuilder	No. of Cars	Percentage of Total
American Car & Fdry. Co.		
St. Louis, Mo.	2,425	12
Milton, Pa.	40	—
General American Trans. Corp.		
E. Chicago, Ind.	1,667	8
Sharon, Pa.	80	—
Bethlehem Steel Corp.	2,775	14
Mather Stock, Chicago	38	—
Mt. Vernon Car	1,450	7
Pressed Steel Car Co.	1,220	6
Pullman-Standard Car Mfg. Co.		
Bessemer, Ala.	2,200	11
Butler, Pa.	1,100	6
Michigan City, Ind.	1,650	8
Ralston Steel Car Co.	740	4
Railroad Shops		
Chicago, Milwaukee, St. Paul & Pacific	1,135	6
New York Central	1,301	7
Pennsylvania R.R.	1,001	5
Reading Company	700	4
Wabash Railway (Ann Arbor)	450	2
	*19,972	100

*Allocation of 28 cars unavailable at this time.

railroads' opinion of what they needed for 1943 turns out to be correct and the WPB's approval of 20,000 freight cars for the first six months seriously misses the mark, the railroad picture is due for a "complete blackout."

Subject of much hush-hush and in cloakroom corridor conversations is the unmistakable increase in railroad wrecks during recent months. The important result of these wrecks is far more serious than the causes. Manpower failure, overloading of a single freight car, fog, or cold weather may combine to cause these wrecks, but the sad part is that several freight cars out of each wreck which are urgently needed must be sent to the repair shops for minor repairs or to be completely overhauled, to say nothing of the damage to locomotive power. There are some people who believe that the recent ODT order No. 18 calling for maximum loading of freight cars may have been the "straw that has broken some of the camel's backs." There is no doubt, according to reliable sources, that hundreds or even thousands of freight cars have been kept in service which during ordinary times would have immediately been sent to the repair shops.

The railroads have been forced into a situation where the lack of sufficient new cars and the heavy traffic demands have made it almost mandatory to keep some cars in transit which are potential accident hazards. The situation has now reached the point where, as the ODT itself says, more and more freight cars and locomotives must be taken out of service. The repair time on these will be longer than usual owing to the greater amount of repairs necessary.

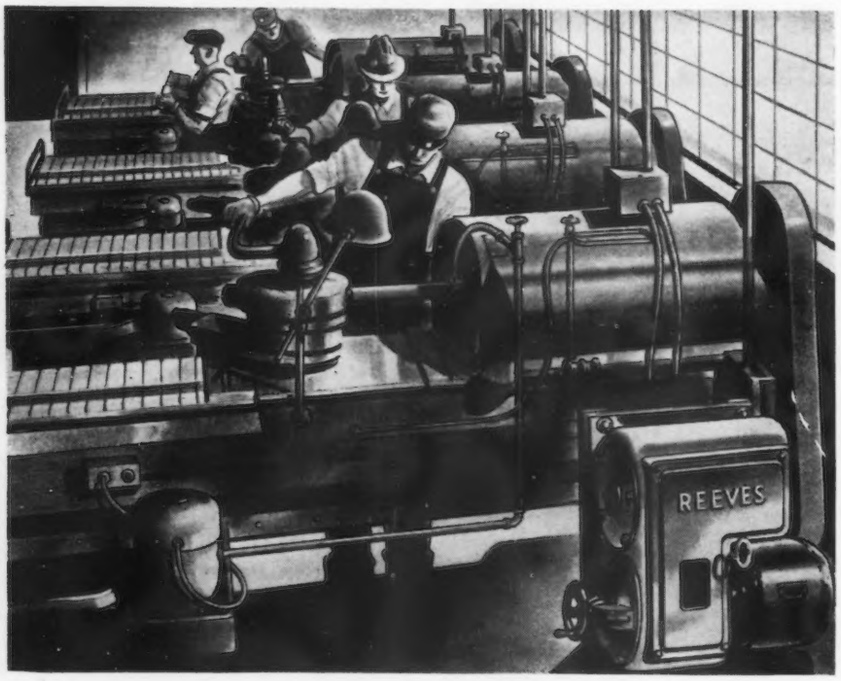
Railroads and their shippers many times have no advance notice of sudden troop and equipment movements, with the result that so-called surplus cars are often wiped out in a moment's notice.

In the carbuilding field, it is clear that priorities have retarded rapid completion of those cars which finally had been approved. When plates were a bottleneck, trouble shooters were put on this product and the tight position of shapes was overlooked. When plates became available, and shapes were expedited, it turned out that maybe lack of a small tonnage of bars held up large programs. The assignment of a specific priority rating such as AA-2X on the freight car project itself took no recognition of the fact that some products were much tighter than others, and that situation still exists today.

There is a way out for railroads and carbuilders, at least to the extent of expediting what has already been approved, if immediate and close cooperation is obtained between the railroads, the carbuilders, and the proper claimant agency. According to reliable sources, a complete restudy of the requirements for the 20,000 freight cars and the rapid completion of the necessary forms and estimates and other data required to obtain an allotment number under the CMP plan WOULD PLACE THESE NEEDS AHEAD OF ANY STEEL ORDERS WHICH CARRY PRIORITY NUMBERS BUT NO ALLOTMENT NUMBERS. Since allotment numbers will be honored after April 1, it seems possible to some sources here that unusual initiative by railroad people and the ODT in complying with CMP requirements, would expedite the completion of car and locomotive programs already approved.

They Made 4 Machines Do the Work of 5—

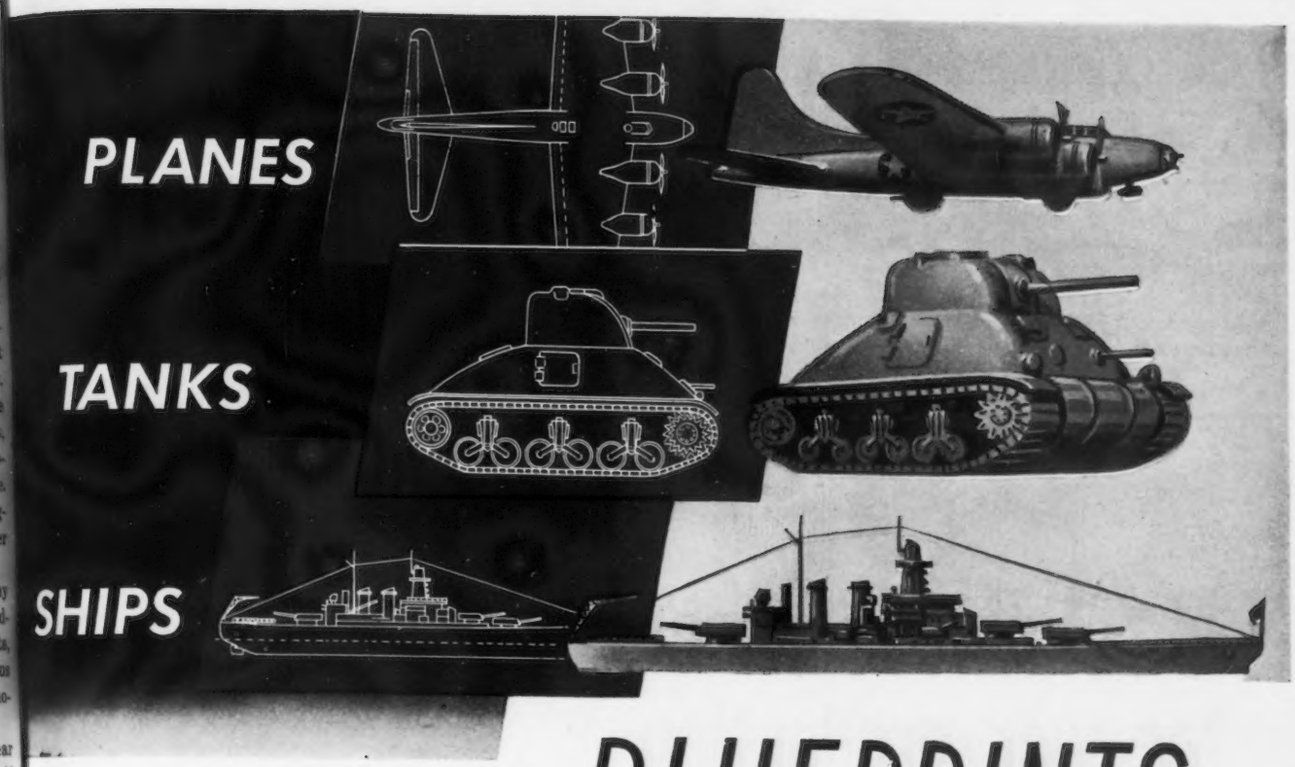
by installing REEVES Variable Speed Drives



• A Detroit machine shop increased its output of gun parts 25%—with no extra machines, no extra labor, no extra floor space. This increased output was achieved by installing REEVES Vari-Speed Motodrives on the lathes they had. Result—four machines—*and four operators*—not only did the work of five, but gave greater precision in machining. This is no unusual example of REEVES performance. Productive capacities of men and machines are often doubled with REEVES units, which provide full-range, stepless speed adjustability. Operators can always run REEVES-equipped machines at the best speeds for constantly changing conditions. . . . Standard equipment on 1,440 different makes of new machines. REEVES Speed Control is available in many designs and sizes for application to all types of driven machines *now in service.* Booklet IG-423, "More Output for Victory," tells the story. Write for it.

REEVES PULLEY COMPANY • COLUMBUS, INDIANA

REEVES SPEED CONTROL



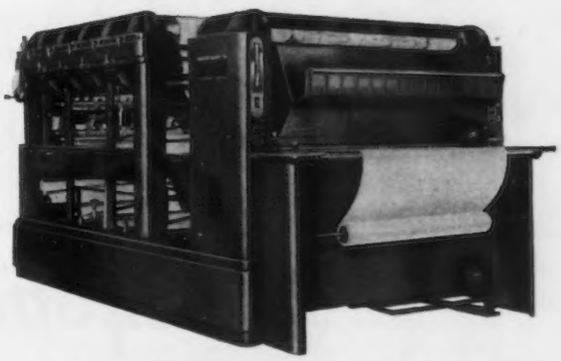
BEGIN LIFE AS BLUEPRINTS

AT 30 FEET PER MINUTE ON PEASE MODEL "22" MACHINES

In placing our Vital War Equipment Designs on a mass production basis, Blueprints are indispensable. To provide the necessary Blueprints in volume and on time, Pease Blueprinting Machines are indispensable. They operate faster, more economically and require less attention... make sharper, clearer, more contrasty prints at 30 linear feet per minute... a performance unequalled by any other tracing reproduction equipment.

Get acquainted with the Pease line of Continuous Blueprinting Machines and you will understand why Government Departments, Commercial Blueprinters and industrial organizations rely on Pease Blueprinting Equipment to help speed production in our Victory program.

***Pease Special Features** that help speed production. **Sliding "Vacuum-like" Contact** smooths out tracings. **Three Speed Lamp Control** provides operation at 10, 15 or 20 amperes, does away with running speed and dryer heat changes. **Actinic "No-break" Arc Lamps** burn for 45 minutes without breaking arc, resume instantaneously. **Horizontal Water Wash** floats prints free from tension and prevents wrinkles, stains, bleeding. **Quick Change Chemical Applicator System** very economically allows change from Blueprints to Negatives in 30 seconds. **Rapid Drying Drums**, heated by gas or electricity, are thermostatically controlled.*



***Pease Model "22"** Continuous Blueprinting, Washing, Developing and Drying Machine. Production Speed 30 feet per minute.*

THE C. F. PEASE COMPANY

2695 WEST IRVING PARK ROAD • CHICAGO, ILLINOIS

Blueprinting Machines A TYPE AND SIZE FOR EVERY REQUIREMENT INCLUDING DIRECT PROCESS PRINTING

Hours Cut Sharply for Making Bombers

Washington

• • • **Industrial engineers** have cut the production time on medium bombers from the 70,000 man-hours it required to turn out the first planes to 13,000 man-hours, Congress was told last week.

Col. Lewis Sanders, chief of the reemployment division of the Selective Service, told the Senate Appropriations Committee in testimony made public that industry had made remarkable strides in speeding up war production.

"The manufacturers in many plants have stated if they can get a steady flow of raw materials and of sub-assemblies to use their labor efficiently, they can jump their output 50 per cent without any more personnel or any more machinery," Colonel Sanders testified in the committee's investigation into the manpower problem.

Defending the military goal of 10,800,000 men in the armed forces by the end of this year, he said every factor had been taken into account in establishing that figure.

Col. Sanders asserted that there was a margin of safety of 15 to 20 per cent on labor requirements for war production due to increased efficiency. The program also took into account shipping, he said, adding that the time required for construction of 10,000-ton Liberty cargo vessels had been reduced from 1,100,000 man-hours to an average of 680,000.

"Based on our actual performances in shipping and our program for ship construction, and without allowing for any decrease in submarine sinkings," he continued, "we should have shipping enough to transport all of that army as soon as it is ready to transport."

HE DOOD IT: The jeep may have post-war possibilities in agriculture but it won't affect passenger cars; it's a four-wheel drive hog on gasoline. So says D. H. ("Barney") Roos, vice-president in charge of engineering, Willys-Overland Motors, Inc., whose design for the jeep is said to be the one chosen by the Army at the start of the war.

Wide World

A reliable cleaner for war production

WYANDOTTE METAL CLEANER F. S.

• Here is a quick dissolving, long lived, heavy duty cleaner. Built to remove "smut" from steel prior to plating; for stripping Cuprodine and for cleaning small arms ammunition between draws and ahead of plate.

• Wyandotte Metal Cleaner F. S. handles many other cleaning problems. It has high conductivity and excellent rinsing properties.

• There is a Wyandotte cleaner for *every* problem —for use in *all* types of equipment. Wyandotte Field Men are available to help with any cleaning jobs.

Wyandotte

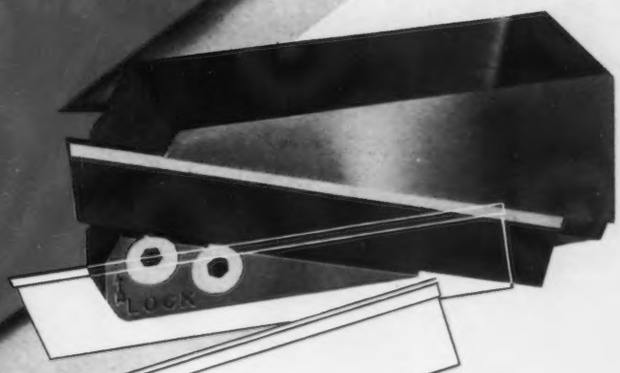
SERVICE REPRESENTATIVES IN 88 CITIES

WYANDOTTE CHEMICALS CORPORATION

J. B. FORD DIVISION — WYANDOTTE, MICHIGAN

Wyandotte Chemicals Corporation consolidates the resources and facilities of Michigan Alkali Company and The J. B. Ford Company to better serve the nation's war and post-war needs.

HERE'S A CUT-OFF TOOL THAT LETS THE COOLANT REALLY GET TO THE CUTTING EDGE



Blade Life Increased
Better Finish Obtained
Valuable Steel Conserved
Grinding Frequency Reduced

EMPIRE TOOL COMPANY'S

LUERS PATENTED

CUTTING-OFF BLADES

Reduce Friction

By being hollow-ground the top of Luers Patented Cutting-Off Blades causes the chip to collapse. This action draws the chip away from the sidewalls of the cut and permits the coolant to reach the friction area.

The reduction of heat brings about the elimination of excessive friction, which results in savings in material and labor, in addition to giving better finish.

Send for Catalog which gives complete information about blades and holders. They are made in models to fit any standard hand or automatic screw machine without alteration to machine.

The Blades That Reduce Friction

EMPIRE Tool Co.

8788 Grinnell Ave.
Detroit, Mich.

THIS SEA-GOING KILLER PACKS A Double Punch!

Streaking through the water at speeds of 60 miles an hour, PT Boats pack more speed and hitting power for their size than any other naval craft afloat. Their capacity to deal death and destruction — like a thunderbolt — makes them one of Uncle Sam's most feared killers of the sea.

★ ★ ★

Double Over-Arms Provide A *Dual Advantage* In Milwaukee Milling Machines

Rigidity and convenience — the Milwaukee double over-arm — scores heavily on both counts.

No other means of arbor support is quite the equal of the double over-arm in *rigidity* — an indispensable quality in any milling machine.

No other means of arbor support affords quite the same quick and easy access to the milling cutter — just a few simple motions and both cutter and arbor are free — an important convenience to the operator at all times.

KEARNEY & TRECKER
CORPORATION
MILWAUKEE, WISCONSIN

Buy Victory with at least 10% in War Bonds!

Milwaukee MACHINE TOOL

"Breaks" LIKE THIS ARE NO "BREAK" FOR PRODUCTION

Broken tools—mechanical troubles — caused by improper care and operation of machine tools, are no help in production for Victory. Practically every machine tool manufacturer offers valuable advisory service — "care and operation" handbooks — technical bulletins — on better methods of operation that help green men as well as speed and improve production of skilled workers.

Put full information in the hands of the men who operate your machine tools — teach them the "know how" to get the most in production with the least waste of time, effort and materials.

Buy Victory with at least 10% in War Bonds!

RIGHT "ON THE Beam" FOR TRAINING MILLING MACHINE OPERATORS...

"MILLING PRACTICE" Visual Training Course

This Visual Training Program, consisting of five sound-slide films dealing with the fundamentals of milling practice, continues to prove highly popular with technical instructors and industrialists everywhere. Interestingly arranged, the films show many types of operations such as T-slotting, angular and straddle milling, circular milling, dovetailing, boring and end milling.

Many shop training directors report unusually successful results with this visual course. It is available on a rental basis at nominal cost. We invite you to write for full information to our Department of Industrial Education.

Kearney & Trecker Products CORPORATION
MILWAUKEE, WISCONSIN
Subsidiary of Kearney & Trecker Corporation

Kearney & Trecker CORPORATION
Milwaukee, Wisconsin

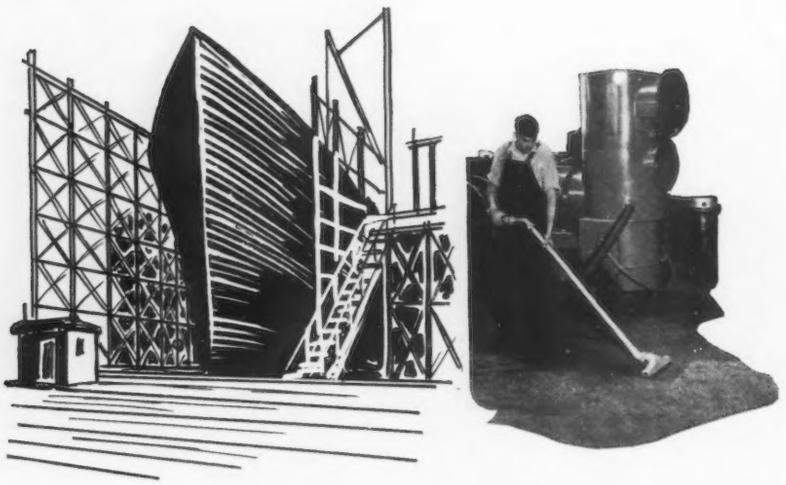
Beehive Coke Supply Seen Tightening

Uniontown, Pa.

• • • **Beehive coke** for blast furnace use is tighter than ever, and authorities look for no change in the picture for several months. One large beehive plant is expected to be without coal within the next three months, which would mean a shutting down of 200 ovens unless coal was found elsewhere. Coal lands attached to this plant will be worked out by that time. Such a shutdown would represent a loss of 10,000 tons of beehive coke a month.

Another factor affecting blast furnace operators is the substantial step-up in rejections on the basis of poor quality. Much of the coal used by beehive coke plants is coming from mines which years ago were classed as of poor quality, but urgent demand for coke has made it necessary to use everything possible. The use of inferior coke, however, in the blast furnaces has cut down pig iron production at a time when maximum output is needed and some blast furnaces are said to be losing considerable tonnage because of coke quality reasons.

Many steel companies in the Midwestern and the Pittsburgh areas have been using beehive coke to supplement by-product coke due to the step-up in pig iron production, which has thrown by-product coke capacity out of balance.



BUILDING SHIPS FASTER
with SPENCER VACUUM

"Clean as you go" is the new watchword in shipyards and plane and tank factories that are making production records.

Spencer Vacuum begins by cleaning during assembly of small parts. In busy plants the debris underfoot is removed 24 hours a day while men work.

Sand is removed after sandblasting of tanks and welding fumes are removed at the arc by Spencer Vacuum.

And when the ship, plane, or tank is completed, all loose chips, bolts, threads, dirt, and dust are removed by vacuum.

Spencer units range from ¾ to 20 horse power in the portable models — and up to 100 horse power stationary.

Ask for the Bulletins.

243 P

SPENCER HARTFORD VACUUM CLEANING
THE SPENCER TURBINE COMPANY, HARTFORD, CONN.

Face Future With Courage, New Englanders Are Advised

Pawtucket, R. I.

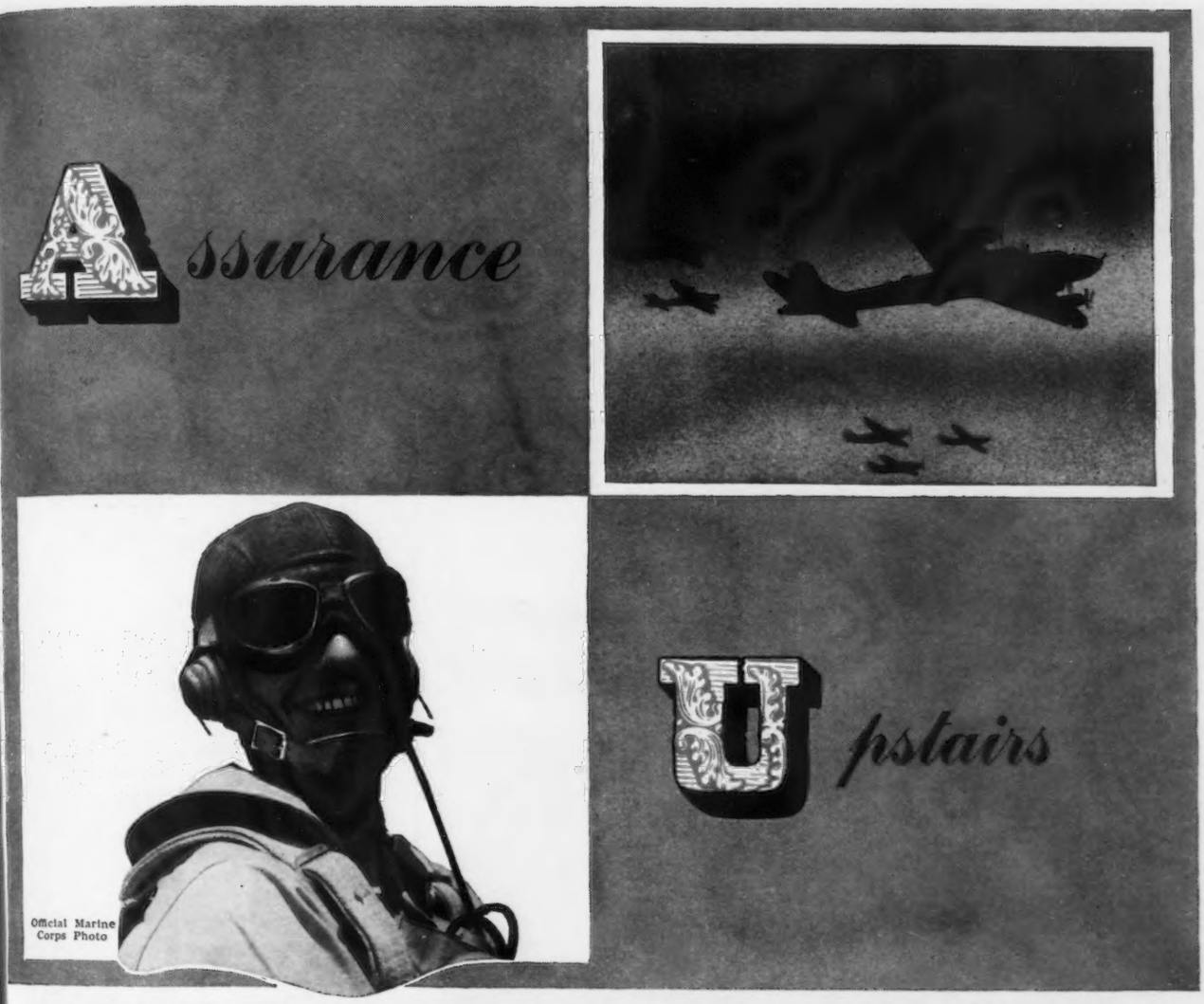
• • • **New England** industrialists, public officials and high-ranking officers of the Army and Navy on Feb. 24 heard former Gov. Robert A. Hurley of Connecticut call upon American industry to face the future with courage and imagination and to accept the major part of the burden of post-war reconstruction. He spoke at a dinner held in his honor at the exclusive Hope Club of Providence upon the occasion of his election as vice-president and director of the Narragansett Machine Co. of Pawtucket.

Among those who joined in the tribute to the former chief executive of Connecticut and the present Democratic National Committeeman of that state were Gov. J. Howard McGrath, Governor of Rhode Island; Ernest Clayton, president, Industrial Trust Co. of Providence; Brig. Gen. Burton O. Lewis, district chief of the Boston Ordnance District; Mayor Thomas P. McCoy, Pawtucket; Herman Steinkraus, president, Bridgeport Brass Co.; Alfred Fuller, president, Connecticut Manufacturers Association; Edmund C. Mayo, president, Gorham Mfg. Co..

Shell Forging Record Made at Christy Park Plant

McKeesport, Pa.

• • • **A single unit** of the National Tube Co.'s Christy Park Works recently produced 12,981 shell forgings in succession without a single rejection. This accomplishment was achieved by four crews of employees, including thirteen young women who have replaced men called up for active military duty.



ARCOS STAINLESS AND ALLOY ELECTRODES FOR WELDING IN THE AIRCRAFT INDUSTRY

Arcos manufactures 29 grades of stainless electrodes. Those most in demand by the aircraft industry are here listed.

Write for further information and data

GRADE	TYPE NO.	% Cr.	% Ni.	% C	OTHERS
Chromend 18/8 Mo.	317	18.0	12.-14.	.07	Mo. 3.0%
Chromend 19/9 Cb.	347	19.0	9.0	.08	Cb. 10 X C (max. 1.00%)
Chromend HCN	310	25.0	20.0	.15	.....
Chromend K	306	19.0	9.0	.07	.....
Chromend 15/35	330	15.0	35.0	.15	.....
Chromang	A Modified 18/8 for Welding Armor				

ARCOS CORPORATION
401 NORTH BROAD ST., PHILADELPHIA, PA.

Distributors Warehouse Stocks in the Following Cities:

Borger, Texas.....Hart Industrial Supply Co.
Boston, Mass. (Belmont), H. Boker & Co., Inc., W. E. Fluke
Buffalo, N.Y.....Root, Neal & Co.
Chicago, Ill.....Machinery & Welder Corp.
Cincinnati, Ohio.....Williams & Co., Inc.
Cleveland, Ohio.....Williams & Co., Inc.
Columbus, Ohio.....Williams & Co., Inc.
Detroit, Michigan....C. E. Philips & Co., Inc.
Erie, Penna.....Boyd Welding Co.
Fresno, Calif.....Victor Equipment Co.
Ft. Wayne, Ind..Wayne Welding Sup. Co., Inc.
Honolulu, Hawaii.Hawaiian Gas Products, Ltd.
Houston, Texas..Champion Rivet Co. of Texas
Kansas City, Mo..Welders Supply & Repair Co.
Kingsport, Tenn.....Slip-Not Belting Corp.
Los Angeles, Calif.....Victor Equipment Co.
Milwaukee, Wis....Machinery & Welder Corp.
Moline, Ill.....Machinery & Welder Corp.
New York, N. Y.....H. Boker & Co., Inc.
Oklahoma City, Okla., Hart Industrial Supply Co.
Pampa, Texas.....Hart Industrial Supply Co.
Pittsburgh, Pa.....Williams & Co., Inc.
Rochester, N. Y.....Welding Supply Co.
San Francisco, Calif....Victor Equipment Co.
Seattle, Wash.....Victor Equipment Co.
St. Louis, Mo.....Machinery & Welder Corp.
Syracuse, N. Y.....Welding Supply Co.
Wichita, Kansas.....Watkins, Inc.

"QUALITY WELD METAL EASILY DEPOSITED"

Navy Tells Why Firms May Lose "E"

• • • **Recently a number** of plants which had won the Army-Navy "E" for outstanding performance on war work have had the award withdrawn, rather than renewed, at the end of the six months for which it is originally given. The reasons for such withdrawals and the Navy's policy in this connection are explained in the following letter sent to THE IRON AGE by the Navy's Incentive Division:

"The Army-Navy Production award originated in peace times when the Navy 'E' was presented to ships of the fleet and their crew members who excelled in gunnery, communications and engineering. These ships and men were the envy of the fleet because the award is not easily won. It is an honor not to be taken lightly, one that is hard to retain once it has been won. The award still is given to the fleet. It has been extended to companies making war materials and is known as the Army-Navy 'E'.

"The 'E' is given to industrial organizations by the Army and Navy Boards for Production Awards for outstanding excellence in the production of war materials for the Army and the Navy. This makes necessary the full and complete cooperation on the part of both management and labor not only in the winning of the award but also in retaining it once the award has been won. The Award Board reviews the record of the company every six months to determine whether the award shall be renewed or withdrawn.

"The award may be withdrawn in the event either management or labor, or both, have failed to uphold the responsibility that goes with the winning of the award. This may result in either management or labor being penalized for failure on the part of the other to maintain the necessary standards of excellence in production.

"Such withdrawal of the award is made in fairness to other companies who have kept their record equal to or above that upon which the award was won. The winning of the award is something the Award Board feels should not be taken lightly and the record of excellence must be maintained if the award is to be retained.

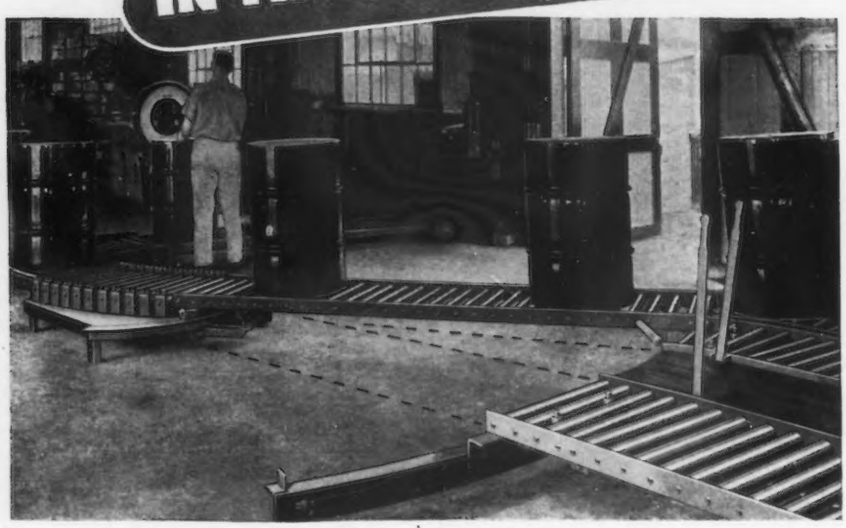
"The principal causes for the withdrawal of an award would be preventable slowdowns in production as to quality or quantity, unjustifiable absenteeism, and work stoppages in the plant. Several awards have been withdrawn for these reasons."

Hollywood Assists Steel Industry Firm

Pittsburgh

• • • Hollywood came to the rescue of a steel company here recently when a strategic piece of steel material was needed for a rush maintenance job. The steel company, unable to get a certain piece of material, queried the Steel Recovery offices here, and was given the name of Paramount Studios to contact immediately for "just what was needed." In a short time the steel was received by the Pittsburgh company and put to use.

OIL *flows* FREELY IN THIS MODERN PLANT



LOGAN 3-WAY ALLIGATOR SWITCH *(patented) facilitates the conversion of three gravity roller storage lines to one line leading to weighing and marking position.*

IN this plant of one of the country's leading oil companies, soundly engineered Logan Conveyors are keeping oil drums flowing smoothly from one operation to the next...saving space, man-hours and improving working conditions. This is but part of a comprehensive Logan handling system which enables the company to cut costs in many ways. Are *your* handling methods as efficient as these? Write for helpful literature or request your nearest Logan engineer to call. Logan Co., Incorporated, 545 Cabel Street, Louisville, Kentucky.

Logan Conveyors

PUT *FLOW* INTO PRODUCTION

HARPER *stocks or makes*

EVERLASTING Fastenings

IN THESE FORMS — OF THESE ALLOYS

ITEM	Brass	Bronze	Copper	Everdur	Monel	Stainless
Cap Screws:						
Hexagon head	STOCK	To Order	To Order	STOCK	STOCK	STOCK
Flat head	STOCK	STOCK	To Order	To Order	To Order	To Order
Round head	STOCK	STOCK	To Order	To Order	To Order	To Order
Fillister head	STOCK	STOCK	To Order	To Order	To Order	To Order
Special	To Order	To Order	To Order	To Order	To Order	To Order
Bolts:						
Machine	STOCK	STOCK	To Order	STOCK	STOCK	STOCK
Carriage	STOCK	STOCK	To Order	STOCK	STOCK	STOCK
Flat head	To Order	STOCK		To Order	To Order	To Order
Round head	To Order	STOCK		To Order	To Order	To Order
Oval head	To Order	STOCK			To Order	To Order
Hangar	To Order	STOCK		STOCK	To Order	To Order
Stove	STOCK	To Order	To Order		To Order	To Order
Special	To Order	To Order	To Order	To Order	To Order	To Order
Screws:						
Thumb	STOCK					
Lag	STOCK	STOCK	To Order	STOCK	STOCK	STOCK
Machine	STOCK	To Order	To Order	STOCK	STOCK	STOCK
Wood	STOCK	To Order		STOCK	STOCK	STOCK
Set	STOCK	To Order		STOCK	STOCK	STOCK
Knurled	STOCK					
Special	To Order	To Order	To Order	To Order	To Order	To Order
Studs	STOCK	STOCK	To Order	STOCK	STOCK	STOCK
Threaded Rod	STOCK	To Order	To Order	To Order	To Order	To Order
Nuts:						
Knurled	STOCK					
Heavy American Standard	STOCK	STOCK	To Order	STOCK	STOCK	STOCK
Light American Standard	STOCK	To Order		STOCK	STOCK	STOCK
Regular American Standard	STOCK	STOCK		STOCK	STOCK	STOCK
Machine screw	STOCK			STOCK	STOCK	STOCK
Castellated	STOCK	To Order	To Order	To Order	STOCK	STOCK
Wing	STOCK			STOCK	STOCK	
Special	To Order	To Order	To Order	To Order	To Order	To Order
Cap	STOCK	To Order	To Order	To Order	STOCK	STOCK
Washers:						
Regular	STOCK	To Order	STOCK	STOCK	STOCK	STOCK
Lock				STOCK	STOCK	STOCK
Counter Sunk finishing	STOCK					
Special	To Order	To Order	To Order	To Order	To Order	To Order
Cotter Pins	STOCK			To Order	STOCK	STOCK
Rivets	STOCK	To Order	STOCK	STOCK	STOCK	STOCK

In the above table, "STOCK" means carried in stock; "To Order" means made to order. Harper stocks a total of 4320 items . . . large quantities of each. Many are "Unusual and hard to get." Besides, the Harper special order department is fully equipped with dies, tools, taps and special machinery to make a variety of "super-unusual and out of the ordinary" fastenings.

YOU NEED OUR CATALOG

. . . and reference book. 80 pages—4 colors —193 illustrations — numerous tables and other data. Free when requested on company letterheads.

THE H. M. HARPER COMPANY
2607 Fletcher St., Chicago, Ill.
45 W. Broadway, New York City

Offices in Principal Cities

ARMY E NAVY

HARPER *Chicago*
EVERLASTING FASTENINGS

Dominion Steel Gets Tube Firm; Mines in Newfoundland Close

Toronto

• • • **Dominion Steel** & Coal Corp. Ltd., has acquired, through stock purchase, control of Canadian Tube & Steel Products Ltd., Montreal. While officials have not announced their plans for this new undertaking, it is understood that the Canadian Tube plant, may be operated in association with the Peck Rolling Mills, acquired by Dominion Steel a number of years ago. Canadian Tube has been manufacturing wrought pipe, bolts, etc.

Officials of Dominion Steel & Coal Corp., announced that the iron mines it controls at Wabana, Newfoundland, closed Feb. 25. Shipping difficulties were given as the reason for closing down the mines, which have been the major iron ore supply to the company's steel works at Sydney, N. S. While company officials were unable to state when operations would resume, C. D. Howe, Minister of Munitions and Supply, stated in the House of Commons, that the mines would start operation again when the navigation season opens. The Government will furnish boats to carry the ore to the steel mills at Sydney, Mr. Howe stated.

Dominion Steel officials stated that more than 500,000 tons of iron ore has been stockpiled at the mine, but did not disclose the tonnage held at the Sydney steel mills. Since last November the company has been gradually reducing operations at the Wabana mines. On Nov. 1, the mines were put on a five-day a week basis, and at the first of this year dropped to three days a week, which reduced production from 5700 to 2400 tons of ore per week. It was stated the company could not afford to continue operating on this basis and closed down completely.

Dominion Steel is operating three blast furnaces at its Sydney works with rated capacity of 490,580 tons of pig iron per year.

Previous to the war, most of the iron ore produced from the Wabana

How to Keep YOUR Electric Cranes & Hoists

EVERLASTINGLY ON THE JOB

THE MAINTENANCE MAN'S CREED—"An ounce of prevention is worth a pound of cure."—was never more significant than it is under today's grueling production schedules.

IN THE MANUAL illustrated here, for use with Shepard Niles' Cranes and Hoists, maintenance men will find the answer to many problems of crane and hoist care and operation. This manual has been planned expressly to do two things:

FIRST, to assist the war effort, by helping to prevent costly shutdowns, through timely suggestions on crane and hoist operation.

SECOND, to help the maintenance man make repairs on the spot, quickly and efficiently, through furnishing him with detailed information, amply illustrated and easily found, concerning the construction of Shepard Niles' Cranes and Hoists.

WRITE FOR YOUR COPY TODAY

YOU MAY NEED IT TOMORROW

● 104 pages—amply illustrated with sectional views and line drawings. Covers the complete line of Shepard Niles' Electric Cranes and Hoists. Sturdy, flexible cover. Special binding for easy opening. Convenient (7¼" x 10¾") size.

Shepard Niles

CRANE & HOIST CORPORATION

356 SCHUYLER AVENUE • MONTOUR FALLS, N. Y.

AN AVOIDED PRIZE: Buck, the "white elephant," is awarded each month to the Nashville Division department of Vultee Aircraft, Inc., having the poorest safety record for the preceding month. This trophy is avoided as much as the prize trophy is sought by ardent workers.

OHIO FERRO-ALLOYS

... vital to the performance of the National Emergency Steels that will bring Victory many steps nearer during this crucial year

DEPENDABILITY · PHILO BRAND · QUALITY · SERVICE

DEPENDABILITY · RAINIER BRAND · QUALITY · SERVICE

Ohio Ferro-Alloys Corporation

Canton, Ohio

Chicago Detroit Pittsburgh Tacoma

Mines of Dominion was exported to Europe. During the few years previous to 1939 the company was said to be shipping approximately 800,000 tons of ore yearly to Germany and between 300,000 and 500,000 tons to Great Britain, and using from 300,000 to 600,000 tons annually in its own furnaces at Sydney, N. S. However, since export markets have been largely cut off, production from the mines has been going chiefly to the company's own mills in Nova Scotia.

Canada Will Divert Skilled Men to Shipyards

Toronto

• • • **Canada plans** to extend shipbuilding operations and specialize in the production of fighting ships. Desmond A. Clarke, director-general of shipbuilding, said that a plan is under consideration by Hon. Humphrey Mitchell, Minister of Labor, to take skilled men off the production of planes, tanks and other war materials and put them to work building ships.

He said the plan was to take as many men as possible that could be spared from war plants, and estimated the number as in the thousands. Mr. Clarke said Canada's warship production has reached almost 800,000 tons yearly, and is expected to hit the 1,000,000-ton mark this year.

•

Appropriation Approved By Canadian Parliament

Ottawa

• • • **Canadian parliament** approved the $858,000,000 supplementary appropriation bill, submitted by Finance Minister Ilsley, which adds this amount to the $2,000,000,000 voted at the last session for war purposes during the fiscal year which ends March 31 next. Mr. Ilsley stated that this additional amount was arrived at by the most careful estimate that could be made of the amount by which the original appropriation would fall short of requirements. During last summer and fall it was expected the budget figure for government costs for the fiscal year would be $3,900,000,000 but now it is estimated the total government expenditure for the current fiscal year ending March 31, 1943, will total $4,500,000,000. Canada's war expenditure for the month of January this year was $185,031,534.

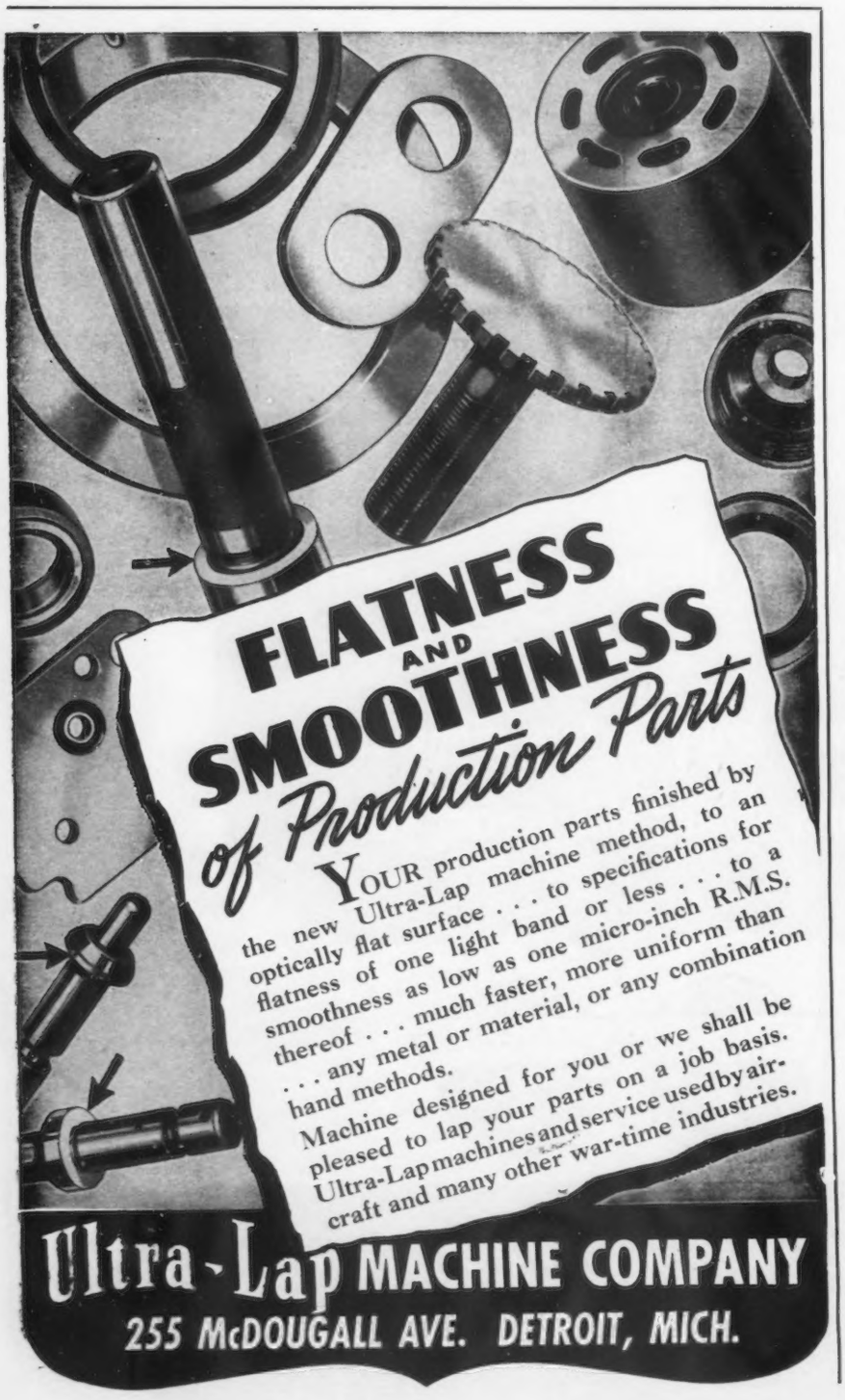
•

Canadian Plant Closes; Lacks Steel Due to Strike

Toronto

• • • **Faced with** a shortage of some 800 tons of steel necessary to maintain operations of its gear division, McKinnon Industries, Ltd., St. Catharines, Ont., closed this branch of its plant this week. It will remain down until further supply of steel is available.

This shutdown, company officials state, is directly due to the cessation of steel production at Algoma Steel Corp., Ltd., Sault Ste. Marie, during the two weeks in January when workers were on strike. Algoma Steel is the chief source of steel supply for McKinnon Industries, which is engaged 100 per cent on production of war materials. The gear division of the company produces transmission gears for the all-Canadian General Motors mechanical transport vehicles, and it is stated that the shutdown will eliminate delivery temporarily of these essential vehicles.


FLATNESS
AND
SMOOTHNESS
of Production Parts
YOUR production parts finished by the new Ultra-Lap machine method, to an optically flat surface . . . to specifications for flatness of one light band or less . . . to a smoothness as low as one micro-inch R.M.S. thereof . . . much faster, more uniform than . . . any metal or material, or any combination hand methods.
Machine designed for you or we shall be pleased to lap your parts on a job basis. Ultra-Lap machines and service used by aircraft and many other war-time industries.
Ultra-Lap MACHINE COMPANY
255 McDOUGALL AVE. DETROIT, MICH.

READY-POWER

EQUIPPED ELECTRIC TRUCKS

Gas-Electric
POWER PLANTS
for
ELECTRIC TRUCK OPERATION

CONTINUOUS POWER

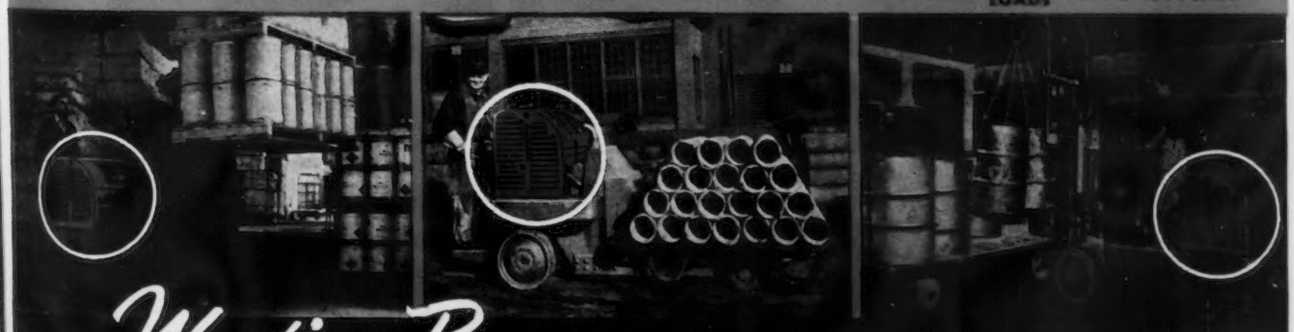
READY-POWER (Gas-Electric) Units on *new* or *existing* electric truck equipment handle more loads per hour per day and per year than the same equipment battery powered. This means a saving in time as well as a saving in money by accomplishing a given amount of work in less time at a lower cost per ton handled. Since 1924, thousands of Ready-Power Units have been adapted by industry to their toughest jobs. READY-POWER'S reliability and superior performance have been proved. Ask for literature.

PEAK PERFORMANCE

READY-POWER today serves industry *better,* more *completely,* than ever before with power units that cover the range of trucks from 2000 to 60,000 pounds rating. READY-POWER manufactures a complete line of Gas-Electric Power Units—*not complete trucks.* You can secure *new trucks* complete with READY-POWER from truck manufacturers or you can get READY-POWER units to replace batteries for trucks now in operation in your plants.

Write for information, mentioning type of new trucks contemplated or make and type of trucks now being operated.

MORE PER DAY PER YEAR ★ MORE WORK IN LESS TIME ★ HANDLES MORE LOADS MORE QUICKLY



Get *Wartime Power* for your NEW or PRESENT Trucks

THE **READY-POWER** CO.

3841 GRAND RIVER AVENUE ★ DETROIT, MICHIGAN, U. S. A.

STOP THESE HIDDEN LEAKS
THAT *WASTE YOUR DOLLARS...*

Hundreds of Plants Effect Big Savings with Carey HEAT INSULATIONS

Many industrial plants have hidden profit leaks in the form of waste in production, or excessive overhead. While these leaks may be small in themselves, they may add up to a very costly total.

One pair of bare, 10-inch flanges at 350° F., waste one ton of coal per year. One foot of bare, 10" steam pipe, heated to 700° F., can cost you heavy heat loss. Figuring steam cost at 30c per million B. T. U., insulation 3" thick, shows an annual saving of $24.76 per foot of pipe.

Heat loss, through inadequately insulated pipe, is one of the most common of these hidden profit leaks. Scientific tests show, and hundreds of installations prove, that from 70% to 98% of this loss may be saved by correct insulation.

Fortunately for industry, there is a practical way, not only to find these wastes, but also to eliminate them. The Carey organization is equipped to help you uncover the profit leaks in your plant. A phone call or letter to our nearest branch, will bring a representative. Catalog "Heat Insulation for Industry" mailed on request to Dept. 26.

INDUSTRIAL BUILDING PRODUCTS OF
ASPHALT — ASBESTOS — MAGNESIA

ROOFING... SIDING... FLOORING... INSULATIONS... ROOFINGS AND CEMENTS
WATERPROOFING MATERIALS... EXPANSION JOINT... ASBESTOS PAPER AND MILLBOARD

The PHILIP CAREY *Manufacturing Company*
Dependable Products Since 1873
Lockland, • Cincinnati, Ohio •
IN CANADA: THE PHILIP CAREY COMPANY, LTD.
Office and Factory: LENNOXVILLE, P. Q.

Canada Will Extend $1 Billion Lend-Lease Aid

Ottawa, Ont.

• • • **Canada** will extend $1,000,000,000 of lease-lend aid to the United Nations during the fiscal year that begins April 1, 1943, Finance Minister J. L. Ilsley, announced recently in the House of Commons. Mr. Ilsley stated that Canada is setting up a five-man War Supplies Association Board, made up of five Cabinet Ministers, which will transfer supplies directly to Allied countries, on a credit basis, where necessary. He stated that the Canadian Government will ask parliament for a grant of $1,000,000,000 to finance operations of the board, but did not state how long this sum was expected to last.

Mr. Ilsley also stated that under a mutual aid bill, to be introduced in the House, Canada will take over all United Kingdom interests in war plants and equipment in this country, valued at approximately $200,000,000. Canada thus will obtain complete ownership and control of all plants and equipment provided under the joint Canada-United Kingdom capital assistance program administered by the Department of Munitions and Supply.

•

Canada Asks for Declaration of Copper

Toronto

• • • **A new order** by G. C. Bateman, Canadian Metals Controller, stipulates that frozen, dormant or excess stocks of certain copper and copper base alloys, including brass, bronze and nickel silver must be reported to the metals control at once. The order applies to copper and copper base alloys in the form of rod, bar, sheet, strip, rolls, tube, pipe, extruded shapes, welding rod and copper base alloys.

•

Canada to Spend $5.5 Billion

Ottawa

• • • **Canada's** total expenditures for the fiscal year which starts April 1, will amount to $5,500,000,000, according to preliminary estimate. J. L. Ilsley, minister of finance, is asking Parliament for an appropriation of $3,890,000,000 for the 1943-44 fiscal year for war purposes, which is apart from the $1,000,000,000 appropriation to be made for lease-lend aid to other United Nations. Non-war estimates total $500,000,000.

Trade Notes . . .

Franklin Foundry Co., Boston, has purchased the A. D. Weymouth Co., Fitchburg, Mass., 98-year-old wood-working plant and will convert it to manufacture of machine tools for use in the plastic industry.

•

Spencer Wire Mfg. Co., Spencer, Mass., plant has been discontinued and its equipment and employees transferred to the West Brookfield, Mass., plant, now the official plant.

•

Hess Heat Treating Division, New York, has opened a new plant at 604 W. 47th Street. The company is engaged in steel treating.

•

Stroman Furnace and Engineering Co. has now become a division of the Petersen Oven Co. with offices at 300 W. Adams Street, Chicago. This situation was brought about by the fact that business increased faster than plant facilities could be expanded, and it was found advisable to become associated with a corporation with sufficient plant facilities to handle the additional business.

•

Handy & Harman of New York have announced the opening of a Los Angeles office. H. A. Folgner, connected for many years with the company's brazing engineering division in New York, has charge of the office, which is located in the Bendix Building, 1206 South Maple Avenue.

•

A second Meehanite manufacturer has now been established in Southern Rhodesia, South Africa, the F. G. Issels & Son, Ltd., of Bulawayo, according to the Meehanite Metal Corp.

•

Lindsay and Lindsay, Chicago, a new organization formed the first of the year, has now purchased from Dry-Zero Corp. all the assets and business of the former Lindsay Structure Division of that company for the manufacture and sale of Lindsay Structure, a method of light steel construction.

•

E. C. Bowers, president, Wickwire Spencer Steel Co., has announced formation of a new subsidiary organization, Wickwire Spencer Aviation Corp., with administrative offices at 500 Fifth Avenue, New York, and plant facilities in Virginia and Illinois. Principal product will be the recently announced Wickwire automatic variable pitch propeller. The board of directors is composed of E. C. Bowers, Geo. H. Creveling and C. I. Collins. Officers of the new organization are E. C. Bowers, president; Geo. H. Creveling, secretary-treasurer, and C. I. Collins, executive vice-president. J. D. Stites has been appointed manager of subsidiary. F. C. Yeates is general purchasing agent and G. L. Randall is advertising and public relations manager.

•

The Sheffield Corp. of Dayton, Ohio, and the Wickman Corp. have been operating jointly under an exclusive manufacturing and selling agreement involving certain machine tools. Under this agreement The Sheffield Corp. has redesigned and manufactured these machine tools for the American market. Upon the completion of orders received up to March 24, this joint operation under this agreement will be discontinued by mutual consent.

•

The new manufacturing plant and general offices of the Plan-O-Mill Corp., formerly at Royal Oak, Mich., are located at 1511 East 8 Mile Road, Hazel Park, Mich., just outside Detroit. The firm, in addition to manufacturing thread and form milling machines, is now producing a line of cutters.

A step ahead of industry's demands since 1904 by anticipating engineering developments, Continental Screw Company was completely equipped with men, methods and machines to fully meet defense requirements, and later the sudden heavy war production load.

Working for many years on a three-shift schedule our skilled operatives, augmented by trained helpers, take the present emergency demands in their usual stride. Equipped with the latest precision machines, and directed by experienced Engineering and Laboratory Staffs, our full roster of workers daily produce huge quantities of HOLTITE fastenings . . . the most precise, rugged and enduring assembly units science and human skill can devise.

CUT YOUR FASTENING TIME 50%

You can specify HOLTITE fastenings completely confident that they will provide service—a step ahead of the times!

CONTINENTAL SCREW CO. New Bedford, Mass., U.S.A.
BUY MORE WAR BONDS

Renegotiation Seen Speeded By Agencies' New Joint Agreement

Washington

• • • **A joint directive,** designed to expedite clearance of cases involving renegotiation of war contracts, has been signed by the secretaries of War, Navy and Treasury Departments and the chairman of the Maritime Commission. The directive should result in the elimination of the time heretofore required for participating departments to study and approve agreements with war contractors prepared by any of the other departments.

The new arrangement involves a delegation of the powers of each of the three secretaries and the maritime commission chairman to each other. Over-all review of the war profits of a contractor or subcontractor is handled by the department having the predominant monetary interest although the contractor is doing business for two or more departments.

The secretary of the department handling the renegotiation is now empowered to conclude an agreement with a contractor and sign it on behalf of the other departments with which the contractor may have business, such signature being binding on the other departments.

"No contractor or subcontractor," the directive states in part, "shall be required to inquire into the validity or regularity of any assignment . . . and the signature of one of the undersigned secretaries, or of the proper individual or agency within the department with which the renegotiation has been conducted, shall be conclusive evidence of his authority to execute the final or other agreements resulting therefrom in behalf of all the undersigned secretaries."

General Motors Saves Money for Government

• • • General Motors voluntarily reduced prices of war materials delivered in 1942 to the government $169,178,141, C. E. Wilson, president of General Motors, announced Feb. 26. These price reductions were largely due to savings brought about through improved designs, improved and more efficient manufacturing processes, through saving of material and through substitution in some cases of equal or better but less expensive materials.

At the same time Mr. Wilson announced that total deliveries of war materials delivered in 1942 amounted to $1,913,464,090, after price reductions. Deliveries in January, 1943, amounted to $253,795,195.

Honest Attitude of Plants Praised

Chicago

• • • **The honest** and fair attitude of war industries toward profits on war work was praised by officials of the Price Adjustment Boards of the War, Navy and Treasury Departments and the Maritime Commission at the close of a three-day meeting of the boards held here last week. It was said that industry on the whole has been very fair in handling profits on war work. Only a small minority of about 5½ per cent have been found to be making "outrageous profits."

Maurice Karker, chairman of the War Department renegotiation board, said that on the basis of 1942 business, profits recaptured amounted to 12 per cent of the total volume of contracts renegotiated. About 23 per cent of the contracts examined showed no excess profits, he said.

It was pointed out that the War Department contracts now total about $54 billion, of which $8.6 billion has been or is being renegotiated. Of this latter total, approximately $1,045,250,000 had been recovered by the end of January, 1943.

The Navy Department has recovered $850,000,000 and the Maritime commission some $100,000,000 in excess profits. The Treasury department adjustment board, which will deal only with contracts for lend-lease materials, has not yet started operations.

It was reported that in several instances contractors have repaid the government more money than was necessary. Fearing that such excess payments might endanger the company's financial stability, the boards refunded the excess payments in a reverse renegotiation procedure.

The meeting, which was attended by 300 officials of national and regional boards, included a number of round table discussions and case studies.

ARMY "GENERAL STORE": Here is one of the U. S. Army's new igloo type warehouses in Australia, quickly built and easily adapted to camouflage. Note tree growing through roof.

Canada-U.S. Pact Gives Dominion Job of Building More Escort Vessels

Ottawa

• • • **Canada and the** United States have reached an agreement whereby this country will substantially expand its shipbuilding program, and give special attention to the construction of escort and fighting ships, according to announcement made in government circles.

The announcement stated that shipbuilding has been accorded a definite priority rating in war production and study has been given to expansion in the escort vessel program, with the corvette to hold a major part. Lack of escort ships of the corvette type, is said to have created considerable alarm in Washington. The shipbuilding program of the United States virtually overlooked the construction of escort vessels. The international board, on which Canada has representation, has decided to allocate to the Dominion the task of providing an increased number of escort ships. The degree of expansion in the Canadian program has not been announced, but it is stated that production will far exceed the rate of 1942 when 74 corvettes and minesweepers were turned out by builders in this country.

In the general production plans as between Canada and the United States, it is stated that with the Canadian shipbuilding industry on a highly efficient basis, this country can expand its escort vessel program with a minimum of disturbance. It is further stated that the United States will make larger tonnages of steel, components and fittings available to Canada for the building of ships of this nature.

Local government spokesmen stated that the increased emphasis on shipbuilding would not be reflected in any perceptible slowdown in other war industries. There will be some slight labor shifts, but new labor for shipyards will come from war industries that can best spare them.

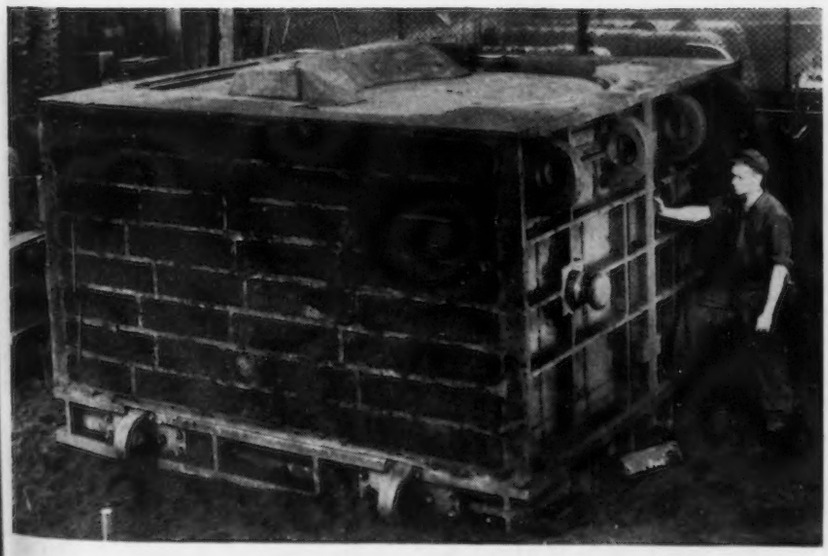
"Price-Minus" Is New Type Ship Contract

• • • **Along with** the development of facilities and methods which have produced the greatest shipbuilding program in the world's history, the U. S. Maritime Commission has designed a new type of contract known as the "price-minus" form, under which the government shares savings in cost equally with the shipbuilder. Under it the shipbuilder, while assured of his actual costs and a small minimum fee, can increase his earnings only by lowering his costs, thus giving him an incentive to effect savings.

This new formula for determining the cost and fee arose out of the commission's objection to the "cost-plus-fixed fee" contract commonly in use, and the desire to encourage the contractor to effect savings and economies in base costs. It is referred to as the "price-minus" type of contract because under it the contractor receives, in effect, the "contract price" minus half of any savings made. The balance of such savings go to the government.

In negotiating this form of contract, the commission makes its own estimate of cost. The minimum fee is based on this estimate and the fee is fixed in dollars at about 3 per cent or less. A "contract price" is set forth in the contract, based also on the estimate, and including a normal profit of 10 per cent or less. If the contractor's actual cost, plus his minimum fee, is less than this sum, he and the Government share the difference. This enables the contractor to increase his fee by cutting cost. As a safeguard, a ceiling profit is also stipulated. Bonuses and penalties for early or late delivery operate within the limits of these maximum and minimum fees.

This type of contract, or a modified form of it, in which emphasis is placed upon savings in man-hours, is used for practically all the present Maritime Commission ship construction. In the few cases where fixed price contracts have been found practicable, provision is made for recapture of excess profits.

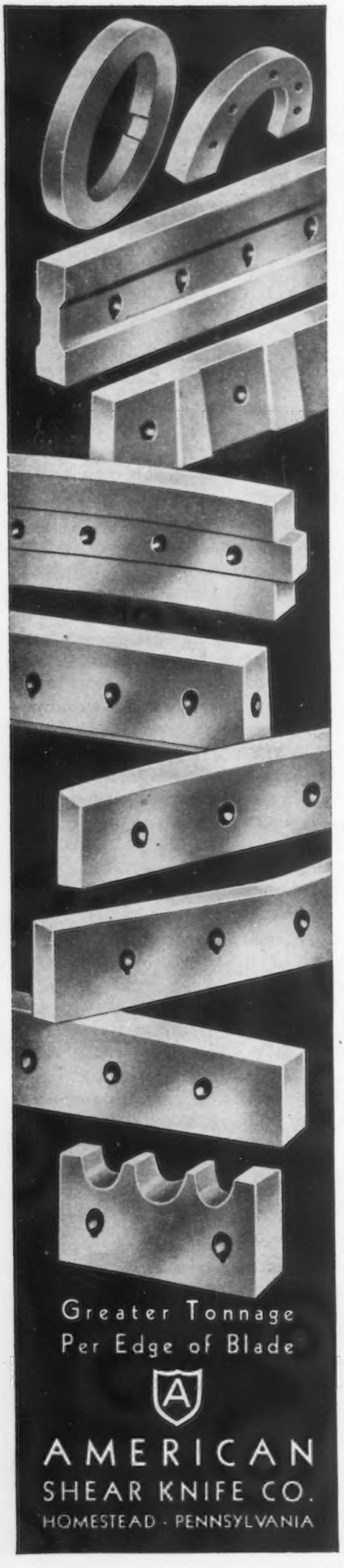


NEW CORE DEPARTMENT: Just completed at a cost of $300,000 as part of a total $750,000 Defense Plant Corp. program, is the new core department at the plant of the Cooper-Bessemer Corp. at Mount Vernon, Ohio. Above is a low pressure steam cylinder drag showing cores in place.

APC Interpretation Protects American Licenses

• • • **Leo T. Crowley,** Alien Property Custodian, announced Feb. 23 that vesting by his office of patents of foreign nations did not mean that rights of American licensees under seized patents were likewise vested.

The statement is based upon an opinion of the general counsel to the Office of Alien Property Custodian which holds that an American licensee under a vested patent or patent application need not file a Form APC-1 to assert his claim to rights under his license.



Briefly Told—

Wire Company Sets 74 Records in Month; Other Industry News of Nation

• **Plants of the American Steel & Wire Co. in January established 74 new production records. During the full year, 1942, the wire company broke a total of 901 of its old records. The Worcester, Mass., operations set the pace for other districts during January, 1943, by breaking a total of 30 records, 16 of them at North Works and 14 at South Works.**

•

• **With its machine shops** at the close of 1942 devoting more than 80 per cent of their entire production capacity to war work and its container factories turning out many types of war supplies and equipment, American Can Co. in its annual report outlined to stockholders its three major channels of participation in the war program of agriculture and industry. M. J. Sullivan, president, told stockholders that, first, the company was able to furnish promptly extensive requirements of containers for packaged foods for the armed forces and our allies as well as to provide special-purpose containers for military needs arising immediately after the start of the war. Second, the engineering and manufacturing skills of the organization, he said, were applied rapidly and effectively to the production of many items of armament. Third, and most important in its effect on both the military and civilian fronts, he continued, was the company's contribution to the development and application of substitute materials and coatings and new techniques of manufacture.

•

• *The transportation problem in Milwaukee being what it is, there is a woman living in Wisconsin Rapids, Wis., who cannot understand the refusal of the Milwaukee Transport Co. to accept her offer of a street car body which she owns. She agrees it would "take some fixing as there are no trucks under it, no seats nor any mechanism to operate it." The street car company's brush off made her so indignant that she appealed to the city's common council for action.*

•

• **War demands for steel in 1942 were largely concentrated upon six major finished products and for these there were new high records of output during the year, according to the American Iron & Steel Institute. The production of plates was 11,543,000 tons, 90 per cent above the previous record output in 1941. Industry produced 4,938,000 tons of structural shapes during 1942 which was eight per cent above the 1941 peak. Production of hot-rolled carbon steel bars in 1942 totaled 6,589,000 tons, two per cent above the 1941 peak. Alloy steel bar output last year was 2,512,000 tons, almost 20 per cent above the previous record. Tool steel bars and barbed wire production was 210,000 tons and 301,000 tons respectively and were also above the 1941 levels. A total of 1,845,000 tons of concrete bars was produced, and 1,241,000 tons of cold finished carbon bars.**

•

• **More than $20,000,000** worth of machinery, tools, office furniture, supplies and other equipment of the WPA is being converted to the war program, according to George H. Field, deputy commissioner of the WPA. Already large quantities of road building equipment formerly used by WPA are being used in the construction of the Alaska Highway.

•

• *The little steel formula for determining wage adjustments should be effective for all industry, Wayne L. Morse, public representative on the War Labor Board declared recently in Chicago on the occasion of the first meeting of the Chicago regional WLB.*

•

• **Windows made of the metal beryllium, which though opaque to light, are more transparent to certain kinds of X-rays than glass, are speeding tests of material used in bombing planes and other war machines. In such applications the X-rays are used to study the way the atoms are arranged. The lattice of atoms that make up the crystals of the metal diffract the X-ray beam. When it falls on a photographic plate there is no longer the single spot which there would be if the metal were not in the path. A symmetrical pattern of spots appears. Though beryllium has previously been used for alloying with copper and other metals, this is the first use ever been found for it in pure form.**

•

• **Directors of Republic** Steel Corp. authorized the redemption on May 1, 1943, of $8,000,000 principal amount of the Corporation's Purchase Money First Mortgage Convertible 5½ per

What ever happened to the Horse Collar Market?

Who won the World Series in 1935? Who was vice-president under Harding? Of 1481 makes of American automobiles, 16 are known today. How many of the *others* can you name? And what ever happened to the carriage wheel business, and where's the horse collar market?

People, products, markets and methods all succumb to change . . . and today that powerful factor of change is doing more to disrupt markets, create new products, and revise production methods than most businesses are even remotely prepared for!

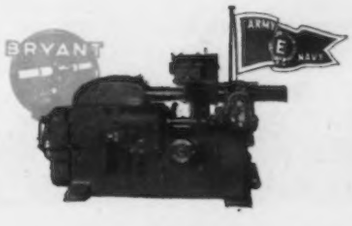
A soap company and a roofing company are operating shell-loading plants. Shipbuilders are building cargo planes. The automotive industry is producing farm machinery, locomotives, air conditioning equipment, and literally hundreds of other unrelated products. Manufacturers are this year spending hundreds of millions of dollars on research alone, and the day this war ends, a new age of production will begin.

Part of this story of change we know first hand, as only specialists can. That part is in the vital and highly specialized field of internal grinding . . . and this much we can tell you on the basis of our own experience with the amazing developments in production that we have seen and helped to produce:

If your business is manufacturing with metal, and if you are planning ahead today for the products you will manufacture tomorrow, the surest way to protect your business against failure from uneconomical production methods is to consult with the leading specialists in machine tool engineering.

Bryant's Consulting Service is available to you at all times. Call upon us now!

SEND FOR THE MAN FROM BRYANT



Bryant Chucking Grinder Company

SPRINGFIELD, VERMONT, U. S. A.

cent Bonds, due Nov. 1, 1954. The redemption price is 102½ and the particular bonds to be redeemed will be designated by lot.

•

• From the eight plants of Pullman-Standard Car Mfg. Co. during 1942, a continuous salvage campaign turned back into productive channels more than 72,000 tons of iron and steel, more than 870 tons of scarcer metals and more than 420 tons of rubber and miscellaneous materials.

•

• **Because desert** temperatures drop to freezing for about two hr. each night it has been necessary to provide protection for the cooling systems of combat cars and motor transports intended for desert use. In addition to the extremes in temperature it has been discovered that wherever there is a flat, unprotected expanse of desert land, protection must also be provided against the circulation of air and resultant shifting of sand which damages engines. Overcoats, or covers, manufactured to overcome these two obstacles are made of fireproof, waterproof duck and lined with hair felt.

•

• **Approximately 70 distinct types of brushing wheels have been assembled for a permanent exhibit in the Smithsonian Institution at Washington by the Osborn Mfg. Co., Cleveland, manufacturer of industrial brushes. The exhibit shows the development of brushing wheels during the last 50 years, and the brushes exhibited are in three general forms, radial, cup and end brushes. They are rotated on chucks, headstocks, grinding heads, power hand tools or flexible shafts.**

•

• *The Manhattan Rubber Mfg. Division of Raybestos-Manhattan, Passaic, N. J., now has 1003 men in the armed forces out of a total of 3900 employees. This large percentage is believed to be a record for industrial plants in the Passaic area.*

•

• **Threatened halts in** war production in New York plants because of shortages of specified critical materials can be avoided in many cases by closer cooperation between purchasing officials, production managers and WPB, in the use of available substitutes, the Regional Redistribution Division of WPB reported. The conclusion was reached after an analysis of experiences of the New York district office in working with war plants in the district. By deviating slightly from specifications involving critical materials, slowing up is avoided.

•

• **A joint directive**, designed to expedite clearance of cases involving renegotiation of war contracts, has been signed by the secretaries of the War, Navy and Treasury Departments and the chairman of the Maritime Commission. The directive, which is indicative of the close cooperation being maintained between the four renegotiation agencies, it was stated, should result in the elimination of the time heretofore required for participating departments to study and approve agreements with war contractors prepared other departments.

•

• **Government war agencies dealing with price and material control have agreed to the standard terminology "war model" to indicate specified models of commodities designed to provide the greatest wartime serviceability at given price levels with the least drain upon manpower, critical materials, plant and transportation facilities, according to the OWI. The use of this term—"war model"—will be reserved to describe commodities which meet the requirements of specifications designated as "war models" in production and price regulations issued by government war agencies.**

WHEN YOU DESIGN NEW PRODUCTS remember

Only JOHNSON BRONZE makes every type of SLEEVE BEARING

New methods . . . new materials . . . new competition . . . three problems every manufacturer will have to face in the post war market.

How are you going to solve them in your product?

If your new design contains a motive unit . . . start with the bearings. They are vital to the performance . . . the operating life . . . the customer satisfaction. They can exert a big influence on your final design . . . the assembly method . . . the replacement problem.

Before you decide which bearing to use . . . consult with Johnson Bronze. Take advantage of our more than thirty years exclusive bearing experience. As we manufacture ALL types of SLEEVE BEARINGS, we base our recommendations on facts . . . free from all prejudice.

There's a Johnson Sales-Engineer as near as your phone. He will be glad to call at your office . . . to review your applications . . . to help you decide which type will best serve your purpose. Why not call him in . . . TODAY?

JOHNSON BRONZE
SLEEVE BEARING HEADQUARTERS
The MOST COMPLETE SLEEVE BEARING SERVICE in the WORLD
505 S. MILL STREET NEW CASTLE, PA.

MORE *man* POWER TO YOU!

Automatics machine more pieces, in less time, in less space, with less waste. They save man hours.

The Conomatic single overhead camshaft makes more room for tooling, cutting oil and chips. Their feed and speed ranges are adequate for any job within their capacities.

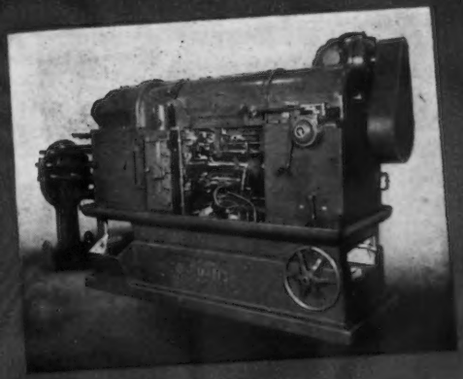
An operator should know his machine, and Conomatics are designed for ready understanding.

Experienced operators usually understand any automatic. Start your new men with Cones.

Your new men will learn quickly on Cones.

CONE Automatic Machine Company, Inc.

Windsor, Vermont, U.S.A.

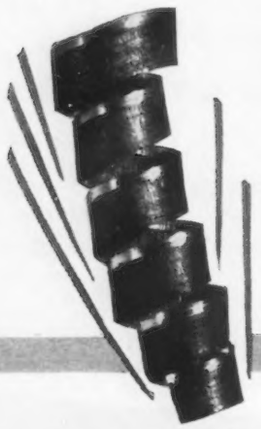


Cereal Cookers fabricated from IngAclad

Golden corn syrup is protected in color and flavor by having tanks lined with IngAclad SHEETS.

Unretouched photo showing machine turning from IngAclad Stainless-Clad Plate.

Stainless Vacuum Steaming Tank nearly 24 ft. long by 8 ft. in diameter. IngAclad made possible large savings in material cost.



Thirteen tons of 3/16" IngAclad Plate used for top section and covers of these Soap Kettles installed in a Canadian plant.

To SERVE and to SAVE!

Designed as a peacetime product for *serving* the Process Industries and for the *saving* of precious alloys, IngAclad has become even more vital in time of War. New applications have been found by our Engineers cooperating with the Armed Services. When Peace is won, the knowledge of these achievements will speed the conversion of many plants to corrosion-resisting equipment through the lower material cost IngAclad makes possible.

To those holding high-rated war orders, IngAclad is available in Sheets 18 to 8 gauge, and in Plate form. Regularly supplied clad with 18-8 Stainless, but also available in other analyses.

We also produce Ingersoll Solid Stainless and Heat-Resisting Alloys. Send us your inquiries.

Plan now for plant and product improvement tomorrow. Investigate IngAclad today. Write for special IngAclad Folder.

INGERSOLL STEEL & DISC DIVISION
BORG-WARNER CORPORATION
310 South Michigan Avenue, Chicago, Illinois
Plants: Chicago, Ill.; New Castle, Ind.; Kalamazoo, Mich.

"A Borg-Warner Product"

INGACLAD
STAINLESS-CLAD STEEL

New Ordnance Dept. Duty: Bikes for WAACs

Detroit

• • • **The Army Ordnance Department, through the Tank-Automotive Center, has undertaken supervision of manufacture of bicycles for WAACs.**

The new bicycles weigh about the same as standard military bicycles but differ in the frame, saddle and a smaller front sprocket required to provide a lower gear. The women's bicycles, designed for heavy duty service, are equipped with maple wood pedal blocks and plastic handlebar grips.

Redistribution Service Lists Materials, Equipment

Cleveland

• • • **More than** 50,000 pieces of industrial equipment are listed as available for use in plants making war goods by the redistribution division of the regional WPB, which serves Ohio, Kentucky, West Virginia, and western Pennsylvania, William F. Duckworth, regional manager of the division, stated this week. It was estimated that 2600 tons of steel and 100 pieces of machinery per week are moving into the ever-growing stream of war production through the efforts of this office. More than 50,000 tons of steel have been moved by the division in the past six months.

The Redistribution Division, which is in no way affiliated with the Steel Recovery Corp., recently expanded to list idle or excess inventories of chemicals, metals, used machine tools, industrial equipment, used machinery, and other essential miscellaneous materials. The division has also taken over the inventory section of the used machinery branch of OPA.

WPB Says Streets and Highways to Be Maintained

Washington

• • • **WBP last week** announced that its governmental division is formulating a plan by which all state and local governments will be assured of adequate equipment to maintain streets and highways for the duration of the war. The plan was described as an equipment pooling arrangement and its success was said by Division Director Maury Maverick to depend entirely upon the willingness of state and local authorities to cooperate.

Lag at Bomber Plant Laid to Two Causes

Detroit

• • • **Modifications in** design and difficulty in securing sufficiently trained personnel were factors blamed by Col. George E. Strong, internal security officer of the Central Procurement District, for a delay in production at the Omaha plant of the Glenn L. Martin Co. on B-26 Martin Marauder bombers.

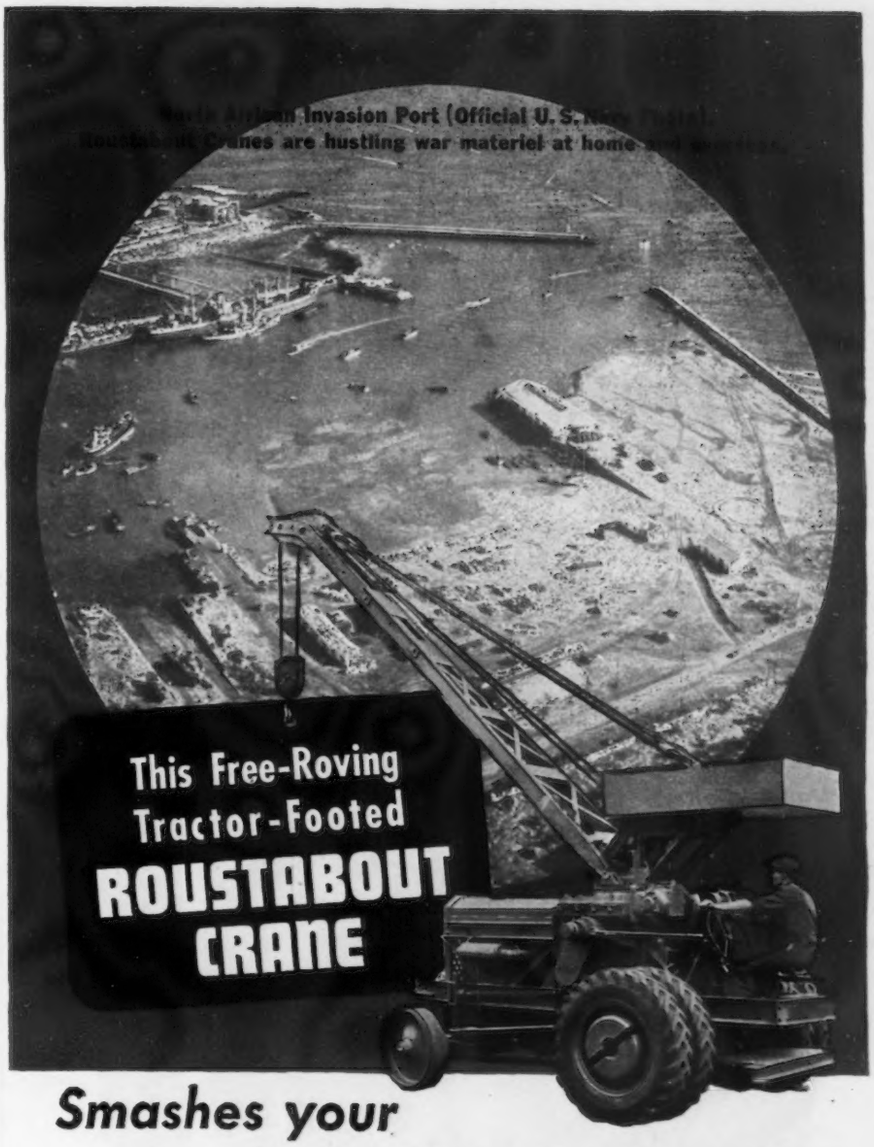
(Complaints by the auto union on the subject of delays at the Martin-Nebraska plant were discussed in the "Assembly Line," Feb. 18, 1943).

Col. Strong said that as combat experience on the Marauder became available, important changes were dictated on the plane including an increased number of guns of larger calibers, differently disposed, as well as larger wings and control surfaces, designed to improve handling qualities.

At the same time, the expansion of operations at the main Martin plant in Baltimore left a minimum of trained personnel available to Omaha from this source, and thousands of agricultural area workers had to be hired and trained.

Said Col. Strong in a formal statement: "The late 1942 picture was that Chrysler, Hudson, and Goodyear were producing their respective sections at a rate far in excess of the number that could be assembled at the Martin-Nebraska plant. In view of these circumstances, production has had to be temporarily held at a less-than-maximum rate in Hudson, Chrysler and Goodyear, pending an acceleration in the final assembly rate."

WPB FUN: Look at WAAC in this picture, taken from page 59 of the WPB Directory of Product Assignments, issued Feb. 1, superseding the Oct. 1 issue of the same publication.



Smashes your Load-Handling Bottlenecks

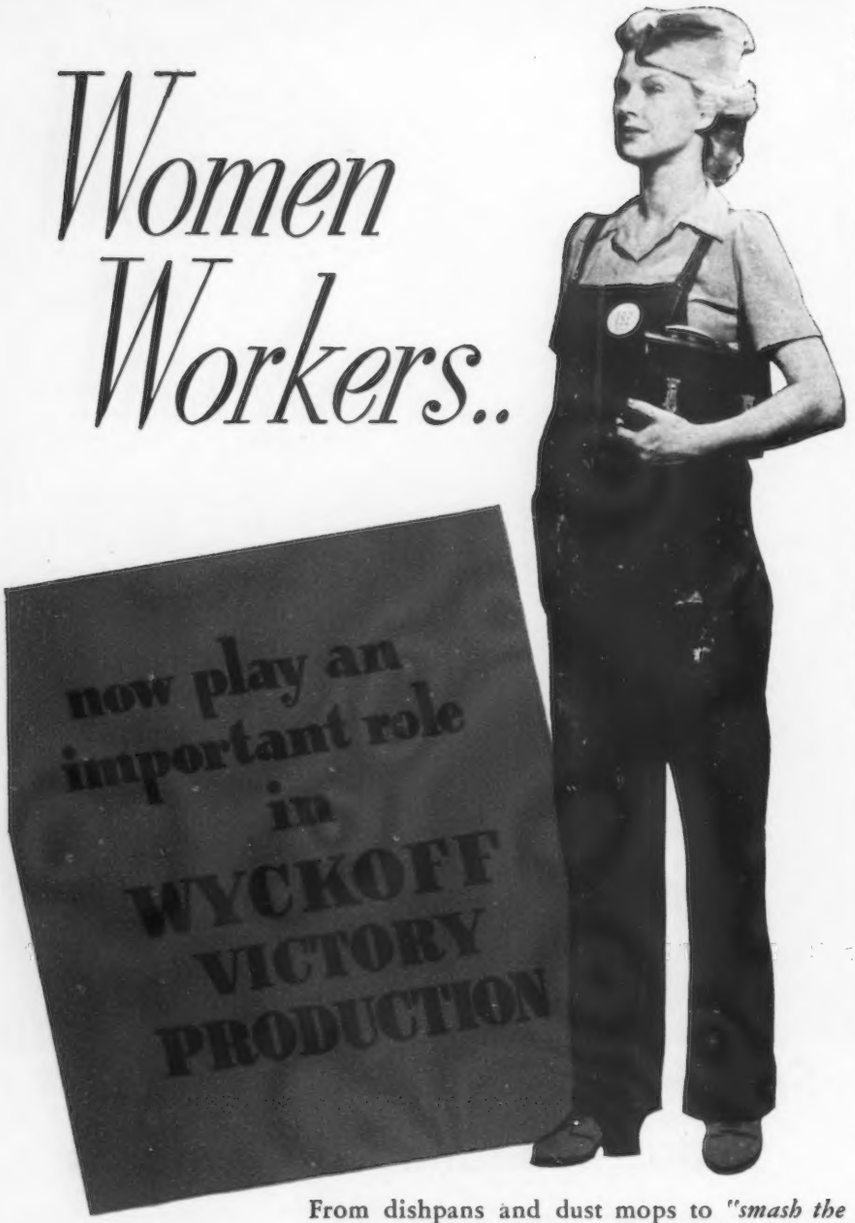
Where you want it *when* you want it, this speedy loadster hustles bulky odd-shaped stuff in and out, up and over—gives you instant load-handling action that prevents costly delays, saves manpower. In hundreds of depots, airports, docks and defense plants, the ever-ready Roustabout Crane moves, stacks, loads anything to 5 tons—without a whimper. Powerfully built for years of overwork—boom rides a heavy-duty ballbearing turntable, enclosed gears run efficiently in oil. Wheel or crawler mounted, easy and inexpensive to operate. For fast action now, for cost-saving later, write for bulletin showing Roustabouts at work.

Keep 'em Flying
Buy U.S. War Bonds

THE HUGHES-KEENAN COMPANY
571 Newman Street, Mansfield, Ohio

ROUSTABOUT CRANES
By Hughes-Keenan

Women Workers..



From dishpans and dust mops to *"smash the axis"* production of fine cold finished steels!

Yes, indeed, the true American spirit! Now approximately 20% of the workers at Wyckoff are women and they are doing a splendid job while Wyckoff men are on fighting duty throughout the world.

This *living, fighting spirit* is traditional at Wyckoff in both men and women . . . as signified by the distinguished joint awards — the Bureau of Ordnance Flag and the Navy "E" Pennant, the All-Navy "E" Burgee, the joint Army-Navy "E" Production Award *with added Star*. These awards are constant reminders of well-done jobs — and still greater accomplishments to which we are pledged, and *will achieve*.

WYCKOFF DRAWN STEEL CO.

First National Bank Bldg., Pittsburgh, Pa.
3200 South Kedzie Avenue, Chicago, Ill.
Mills at Ambridge, Pa., and Chicago, Ill.

Manufacturers of Carbon and Alloy Steels . . . Turned and Polished Shafting . . . Turned and Ground Shafting . . . Wide Flats up to 12" x 2".

WYCKOFF
Cold Finished Steels

Raw Material Board Seen Active After War

• • • **The Combined** Raw Materials Board, which has been planning and integrating the raw materials program of the United States and Great Britain, might contribute substantially toward averting a world scramble for raw materials after the war ends, said W. L. Batt, American member of the Board and vice-chairman of WPB, as he made public Feb. 28 a report on the first year of Board operations.

In the past year, the Board has operated in three major ways: achieving agreement among governments for the supply, distribution and use of major raw materials; working out cooperative U. S.-Great Britain purchasing and supply arrangement; assembling information useful in the settlement of spot, day-to-day problems.

Mr. Batt's statement came only a few days after Sumner Welles, undersecretary of state, made a plea for a start now to work out post-war economic problems. Meanwhile, Secretary of the Navy Knox reiterated that the United States should acquire overseas bases in the making of peace.

•

BEW Controls Commission

• • • **Control** of the United States Purchasing Commission has passed from the Reconstruction Finance Corp. to the Board of Economic Warfare. Creswell Micou, who has been special representative for BEW in Brazil, will head the agency, succeeding S. M. McAshan.

Carbine Rifles to Be Built by G-M Division

Saginaw, Mich.

• • • **The Saginaw Steering Gear Division** of General Motors Corp. has announced receipt of a new prime contract to build a carbine rifle.

COMING EVENTS

March 10 to 12—Grinding Wheel Manufacturers Association and Abrasive Grain Association, Buffalo.
March 18—Joint Meeting Engineers Club and American Society for Metals, St. Louis.
March 25 to 27—American Society of Tool Engineers, Milwaukee.
April 8 to 10—Electrochemical Society, Pittsburgh.
April 12 to 16—American Chemical Society, Detroit.
April 28 to 30—American Foundrymen's Association, St. Louis.

Labor Strikes at Aircraft Production

• • • **Two dangerous labor moves,** striking at our chances for victory, are seen in labor upheavals affecting two plants of the Boeing Aircraft Co., makers of the Flying Fortress and the Cleveland plant of the Aluminum Co. of America, makers of ingot for essential aircraft parts.

At Boeing, a new union weapon apparently replacing the usual strike tactics, a 24-hr. union meeting to discuss grievances, is being used. This became so serious by Feb. 25 that both the Seattle and Renton plants of Boeing were forced to become inoperative for hours at a stretch. Mass union meetings were held in an effort to force WLB to pass a decision granting workers an increase from 62½c. to 95c. an hour. The threat held over the WLB is that mass meetings of all aircraft workers in America would be called with consequent loss of time and "Fortress" production. At press time the deadline had passed without a mass walkout. Some fault for this condition can be placed at the doors of the WLB which has for months been considering the matter of increases and a general stabilization program throughout the aircraft industry.

For additional facts and interpretations on the Boeing labor situation, see West Coast column, page 84.

Almost simultaneously, on Feb. 24, another stab at aircraft production originated in a strike of furnace workers at the Cleveland plant of the Aluminum Co. of America.

In the first action of its kind since the establishment of the regional War Labor Board in the Cleveland area, 82 strikers in the furnace department of the Aluminum Co. of America were automatically fired because of their refusal to return to work Thursday, Feb. 25, after a four-day strike. Despite repeated WLB "work or be fired" ultimatums, production was still at a standstill Friday afternoon, Feb. 26, with only part of the 150 strikers actually returning to work. A full turn and a part turn are now in operation but the 82 furnace men are gone for good.

The strike resulted from the discharge of five men on orders from the Army Air Forces as a result of its investigation of a slow-down that started on Jan. 21 among 60 furnace tenders on two shifts. The slow-down resulted from alleged discrimination in upgrading furnace tenders and a demand for bonus revisions.

The "work or be fired" WLB edict was issued Feb. 24, by the regional War Labor Board. It stated that grievances would not be considered by the board until the department was back in full production.

While the WLB has made the dismissal of the furnace crews effective, there apparently is no relief in sight for the Aluminum Co., where the operations of the department have reduced by more than one-third. The replacement of 82 furnace tenders in the department is quite a problem in the face of current labor shortages in the Cleveland district. However, since this is the first "work or be fired" order put into effect by the WLB, in order to save face they must almost necessarily carry out the order to the letter.

Firing the workers at Alcoa apparently has solved nothing and may be the result of a natural hastiness to effect some kind of action. The production of the department is almost entirely sold in ingot form, with very little of it being processed in Alcoa plants. These 30-lb. ingots go to other war plants for further processing and, while the strike is not holding up production of finished parts and equipment from the Aluminum Co., some vital war plants throughout the country depend upon this source for aluminum requirements.

It will take some time, probably three or four weeks, to re-man the entire department and it may be months before maximum efficiency of operation is attained by the new workers. Consequently, action against strike instigators may have been considerably more effective than a general over-all "work or be fired" order.

Ingot Capacity Now 90,292,660 Net Tons Per Year

• • • **The United States steel industry put into operation nearly 1,100,000 net tons of new steelmaking capacity and more than 3,100,000 tons of blast furnace capacity during the last half of 1942, the American Iron & Steel Institute announced last Friday. In the six-month period open hearth capacity was stepped up 933,650 tons and electric steel capacity was hiked by 329,090 tons. Here are the new figures concisely stated:**

Annual Capacities—Net Tons Source: Iron & Steel Institute

Product	Approx. Goal of Expansion Program	Jan. 1, 1943	July 1, 1942	Jan. 1, 1942	Dec. 31, 1940	Dec. 31, 1939
Steel ingots and castings	96,000,000	90,292,660	89,198,320	88,569,970	84,152,000	80,950,901
Open hearth	.....	79,180,880	78,247,230	78,107,000	74,565,000	73,343,547
Electric furnace	.....	4,554,980	4,225,890	3,738,000	2,586,000	1,592,080
Bessemer *	.....	6,553,000	6,721,400	6,721,000	6,997,000	6,009,920
Crucible	.....	3,800	3,800	3,900	3,900	5,354
Pig iron and ferroalloys	69,000,000	63,933,530	60,816,480	60,394,000	57,610,000	55,724,000

*Decline attributed by Institute to "greater use of converters for the preparation of molten iron to increase open hearth steel production."

Note: A large share of the new capacity reported Jan. 1, 1943, arises from improvement and enlargement of existing equipment.

Few Women Willing to Take Jobs, Buffalo Survey Shows

Buffalo

• • • **Only 59,600 of 373,000 forms** sent out by the U. S. Employment Service and the WMC to measure "womanpower" available for war plants in Erie (Buffalo) County and Niagara (Niagara Falls) County have been returned. Of those returned, only 16.5 per cent expressed a willingness to tackle factory jobs. Of this 16.5 per cent, only a fourth replied to follow-up inquiries.

Wage Increase Asked For Ford Steel Workers

Detroit

• • • **The Ford Motor Co.** and the CIO Automobile Workers filed a voluntary wage agreement with the Detroit War Labor Board asking a 5c. hourly wage increase for practically 2300 steel workers at the Rouge plant. The pay raise was said by union sources to have been based on the Little Steel formula; it was claimed that Rouge steel workers have received no general wage increase since 1941.

Jack & Heintz Co. Offers War Bonds For Attendance Record in Outside Plants

Cleveland

• • • **Tired of hearing** absenteeism blamed on labor and management, Jack & Heintz Co., early in February set up a $7500 bet that absenteeism could be eliminated entirely if approached in the right way. The $7500 was to be distributed in war bonds by lottery among Jahco "associates" (employees) if they worked the whole month without a single unauthorized absentee in all five of the Cleveland and Bedford plants. Last Monday, March 1, a drawing was held to determine who should get the war bonds —sufficient evidence that Jahco workers could set a standard in having no absentees during the month that will serve as a challenge in any field of industry. The full month without an absentee was culminated with the regular monthly Jahco banquet on Feb. 27, when it was announced that the record was made, and then a day off on Sunday, Feb. 28 for all except those working in departments that are slightly behind in the highly accelerated Jack & Heintz production schedule.

Because Jahco was successful in its "no absentees in February" program and to further the war effort, William S. Jack, president of the company, stated at the banquet that the company will offer 125 war bonds of $50 each to the employees of the first war plant of similar size in the country to duplicate the 100 per cent attendance record for any month in 1943.

Leading industry again, Jack & Heintz, Inc., disclosed a far-reaching

AMPCO CASE HISTORIES

Small bronze parts of AMPCO METAL —yet vital to successful performance

On the speedy boats of the "mosquito fleet," the reliability of torpedo-tube mechanism often determines the successful performance of the task.

Here small bronze parts used in the mechanism and made of Ampco Metal play a Herculean part — for metal weakness and failure at critical moments might mean defeat — result in death and destruction. Performance must be reliable; Ampco helps make it that way. This is one of many cases where Ampco Metal is aiding the war effort.

Throughout modern industry also — perhaps in the war material you are producing — vital operating parts often can be made of Ampco Metal, thereby strengthening the part and assuring better performance. If you have parts in your equipment that are subject to metal fatigue, wear, and failure, test Ampco metal and see for yourself how this rugged bronze outperforms other materials and gives you a full measure of satisfaction.

Ampco Catalogue 22 gives technical information. Ask for your copy today.

AMPCO METAL, INC.

DEPARTMENT IA-3 MILWAUKEE, WISCONSIN

AMPCO METAL

AMPCO

THE METAL WITHOUT AN EQUAL

FEMININE TOUCH: **Stella Friend, Philadelphia, once worked alongside her husband, Charles Friend, in a lace mill. Then Charles left to become a paratrooper so Stella gave up her lace-making and became one of a few women who can operate a stainless steel forming machine in the Philadelphia plant of the Edward G. Budd Mfg. Co. She is pictured tightening a roll of stainless steel on a decoiler preparatory to making airplane parts.**

PRODUCTION—THEN VICTORY

SCIAKY SERVICE

CARDINAL SUPPLY CO.
427-30 Sunderland Bldg.
Omaha, Nebraska

C & H SUPPLY COMPANY
2723 First Avenue So.
Seattle, Washington

C & H SUPPLY COMPANY
407 East First Street
Wichita, Kansas

INTERNATIONAL MACH'Y CO.
783 Roberts Street
Hamilton, Ontario, Canada

JOHN BROOKS & CO.
417 St. Peters Street
Montreal, Quebec, Canada

MACHINERY SALES CO.
1274 Folsom Street
San Francisco, Calif.

MACHINERY SALES CO.
3838 Sante Fe Avenue
Los Angeles, California

MARSHALL SUPPLY CO.
109 West First Street
Tulsa, Oklahoma

MASCO EQUIPMENT CO.
2218 Commerce Street
Dallas, Texas

SPECIALTY EQUIPMENT CO.
230 Park Avenue
New York, N. Y.

Sciaky Type PMCR.2S16 Electric Resistance Welder, welding 70 spots per minute, on two sheets of aluminum alloy of .040" each. Welding capacity from two thicknesses of .016" in aluminum alloys up to and including .080".

Sciaky Welding Machines are in constant operation twenty-four hours a day. Every spot and seam weld made with the Sciaky Process of Resistance Welding (and they run into the billions) is a vital link in the cause of victory. Sound-positive-forged welds are synonymous with Sciaky. The exclusive principles of stored energy with preheating and variable pressure with precompression are more vital today than ever before. Only Sciaky invented and pioneered these important features, which are a part of the Sciaky Process of Resistance Welding. When welding problems confront you, call on us. Our engineering and metallurgical staffs backed with years of experience and service are at your command.

A COMPLETE LINE OF AC & DC SPOT SEAM AND PORTABLE WELDERS FOR ALUMINUM-ALLOYS AND STEEL

Pamphlet describing the Sciaky Process of Electric Resistance Welding mailed free. Use company letterhead, please

SCIAKY BROS.
4915 W. 67th St.
Chicago, Illinois

SCIAKY

PROCESS ELECTRIC RESISTANCE WELDING
STORED ENERGY · VARIABLE PRESSURE
WITH PREHEATING · WITH PRECOMPRESSION

plan to offset an expected post-war depression period in the interval between the time war production ends and tooling up for peace-time production is completed. To date, $7,500,000 has been set aside from the profits of the company to provide work for 6000 associates during this after-the-war adjustment period.

The fund was quietly established last year and since that time all but about 2 per cent of the company profits have gone into it. The fund is not an "unemployment compensation" program, but will be used only to keep men at work during the period of readjustment. It is expected that the policy of two 12-hour shifts a day, seven-day week operation will be abandoned after the war for two eight-hour shifts, five days a week until the plant is retooled. Then, the associates will vote on how they want to work.

ARMSTRONG

Drop Forged Wrenches

For industrial use and wherever quality counts ARMSTRONG WRENCHES are preferred for their extra strength, improved designs, finer steels, correct heat treatment, accurate openings and better balance.

Over 100 types, each in all sizes. Drop Forged Carbon and Chrome Vanadium Steel Open End and Box Socket Wrenches . . . Chrome Vanadium Detachable Head Socket and Hollow Screw Wrenches . . . Great Construction Ratchets . . . Special Wrenches of all types on short notice—standardize on "ARMSTRONG WRENCHES" they are the finest obtainable.

Write for Catalog Co-39

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

309 N. Francisco Ave., Chicago, U.S.A.

Eastern Warehouse and Sales: 199 Lafayette St., N. Y.

Buy ARMSTRONG TOOLS from your Supply House

ARMSTRONG TOOL HOLDERS Are Used in Over 96% of the Machine Shops and Tool Rooms

Hiring Rules Seen As Threat to 1943 Iron Ore Shipments

Washington

• • • **Burdening Great Lakes** ore carriers with hiring restrictions at a time when extreme weather is already seriously threatening essential steel production will imperil the war effort, it was declared jointly today by four carriers in an appeal before the War Labor Board.

Contesting the demand of the National Maritime Union of America (CIO) for "hiring hall" regulations, requiring employers to engage all seamen through union halls, were Inland Steel Co., Interstate Steamship Co., Bethlehem Transportation Corp. and International Harvester Co.

This was the final hearing in a case which has been contested before WLB since Sept. 12, 1942. In a directive order earlier this month the seamen were granted wage increases amounting to $22 per month. Three other issues, including the hiring hall question, the board returned to the employers and the union for further negotiation. They were unable to agree, however, and in order to assure settlement before the opening of the shipping season asked WLB to rehear the case.

The employers contend that the union's demand for the hiring hall discriminates in favor of union members, and conflicts with the board's directive.

"During the shipping season of 1942," the employers pointed out, "the ore carrying vessels on the Great Lakes transported more than 92,999,000 tons of iron ore. Because of extreme weather conditions this winter, it is probable that the opening of navigation on the Great Lakes will be later this year than it was in 1942, and that the shipping season may be shorter. In 1942 more than 8,000,000 tons of iron ore were transported over the Great Lakes before May 1.

"It is absolutely essential, therefore, that the operators of the ore carrying vessels be able to recruit seamen and assign them to their duties without burdensome restrictions. The employers believe that recruiting through the union hiring hall and on the rotary system would seriously interfere with the operation of their vessels and imperil their work and would generally cause serious unrest and disturbance among the crews, with resulting impairment of their ore carrying ability and, therefore, of their contribution to the war effort."

The companies also contested

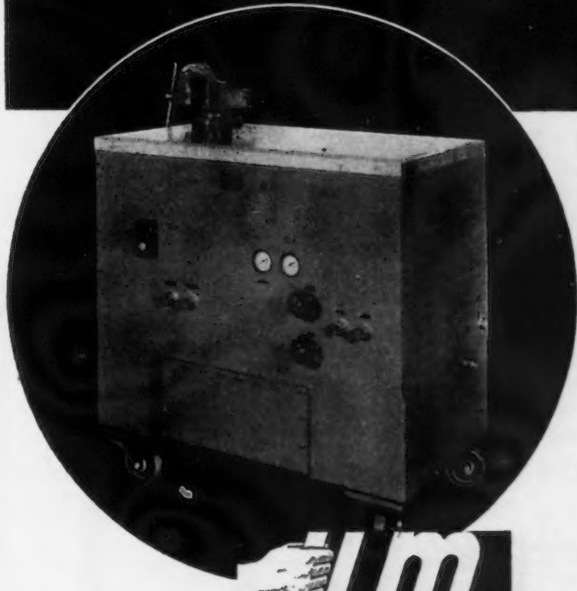
for checking — V HYDRAULICS
BEFORE & AFTER ASSEMBLY

Besides the two models illustrated—there are many other "HY-MAC" test units for various purposes in the field of aircraft. Here is a brief description of a few others:

T-103 Stationary Hydraulic High Pressure Tube Tester—primarily designed for testing flexible tubing but also used for checking short sections of plain metal tubing . . . as many sections as required may be tested at a time . . . the Hydraulic Pump is capable of a 1000 lb. per square inch pressure that may be built up to a 10,000 lb. per square inch pressure by means of a built-in intensifier.

T-104 Water Pressure Test for Aircraft Cylinder Heads. . . . Heads are clamped into position on a trunnion that may be rotated for inspection. It is operated by a Hydraulic power plant capable of producing 1000 lb. per square inch, which is supplemented by a high pressure hand pump or intensifiers to accomplish whatever pressure is required. All of the mechanism is enclosed.

Send for complete information regarding "HY-MAC" HYDRAULIC TEST EQUIPMENT.



T-102 Principally used for checking aircraft tubing this stationary Hydraulic Test Bench with a variable test pressure ranging from 0 up to 10,000 lbs. per square inch and a variable delivery pumping unit 0-12 gal. per minute—is used to test anything in the line of hydraulic equipment before its assembly into aircraft.

T-101 Portable Hydraulic Test Bench is used for pre-flight checking of the hydraulic circuits of planes—for checking all of the hydraulic functions without running the airplane engines. It may also be equipped with a gasoline engine driven pump for field testing.

HYDRAULIC MACHINERY, INC.
12825 FORD ROAD • DEARBORN, MICH.

Hy-Mac

HYDRAULIC MACHINERY

union's demands for penalty payments for certain types and conditions of work, and for unrestricted passes to union officials to go aboard the company's ships.

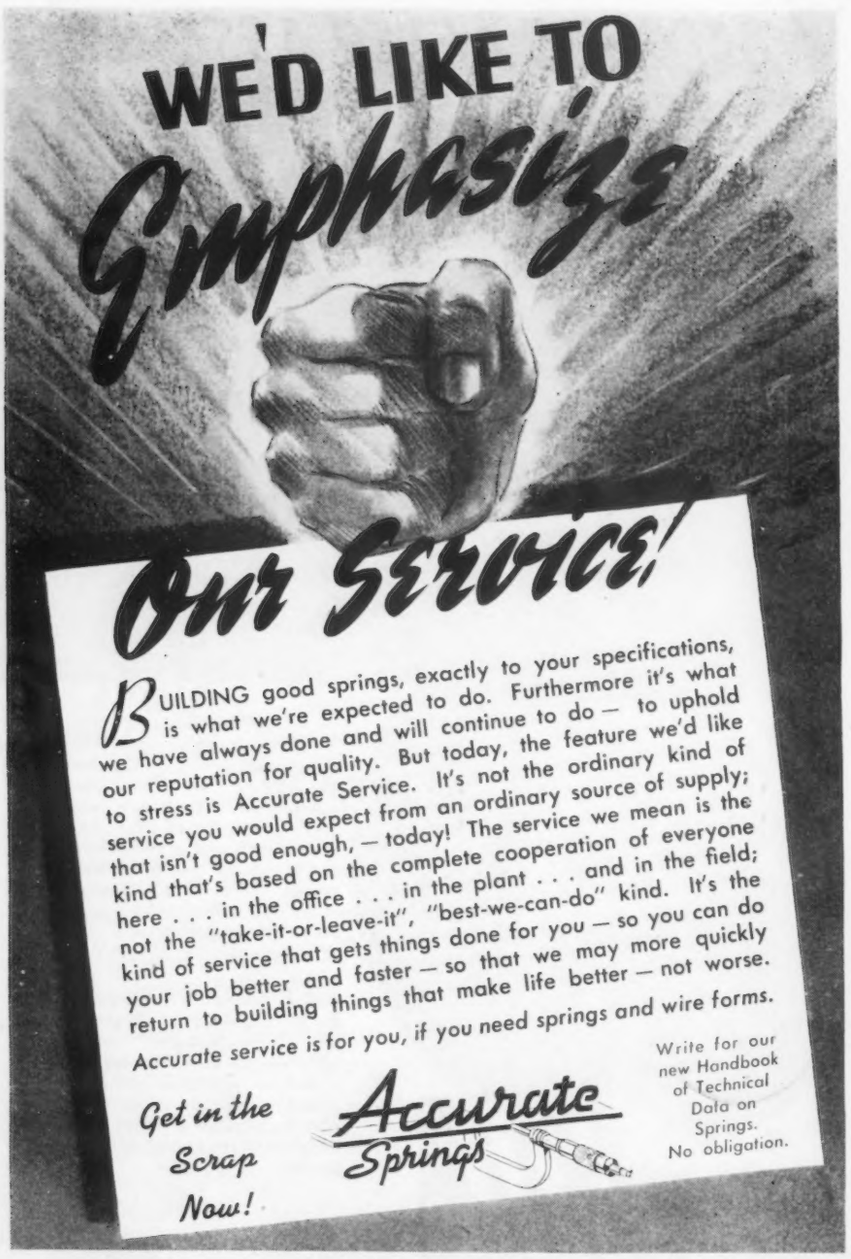
Great Lakes seamen have already received increases of more than 50 per cent, the companies stated, and requiring penalty payments for certain work will serve only to further increase wages, and will in no way alter the seaman's routine.

Membership Named to Minerals, Metals Committee

• • • **Membership** of the Minerals and Metals Advisory Committee and the Mineral Resources Operating Committee was announced recently by Howard I. Young, director, Mineral Resources Co-ordinating Division, WPB, and chairman of both committees.

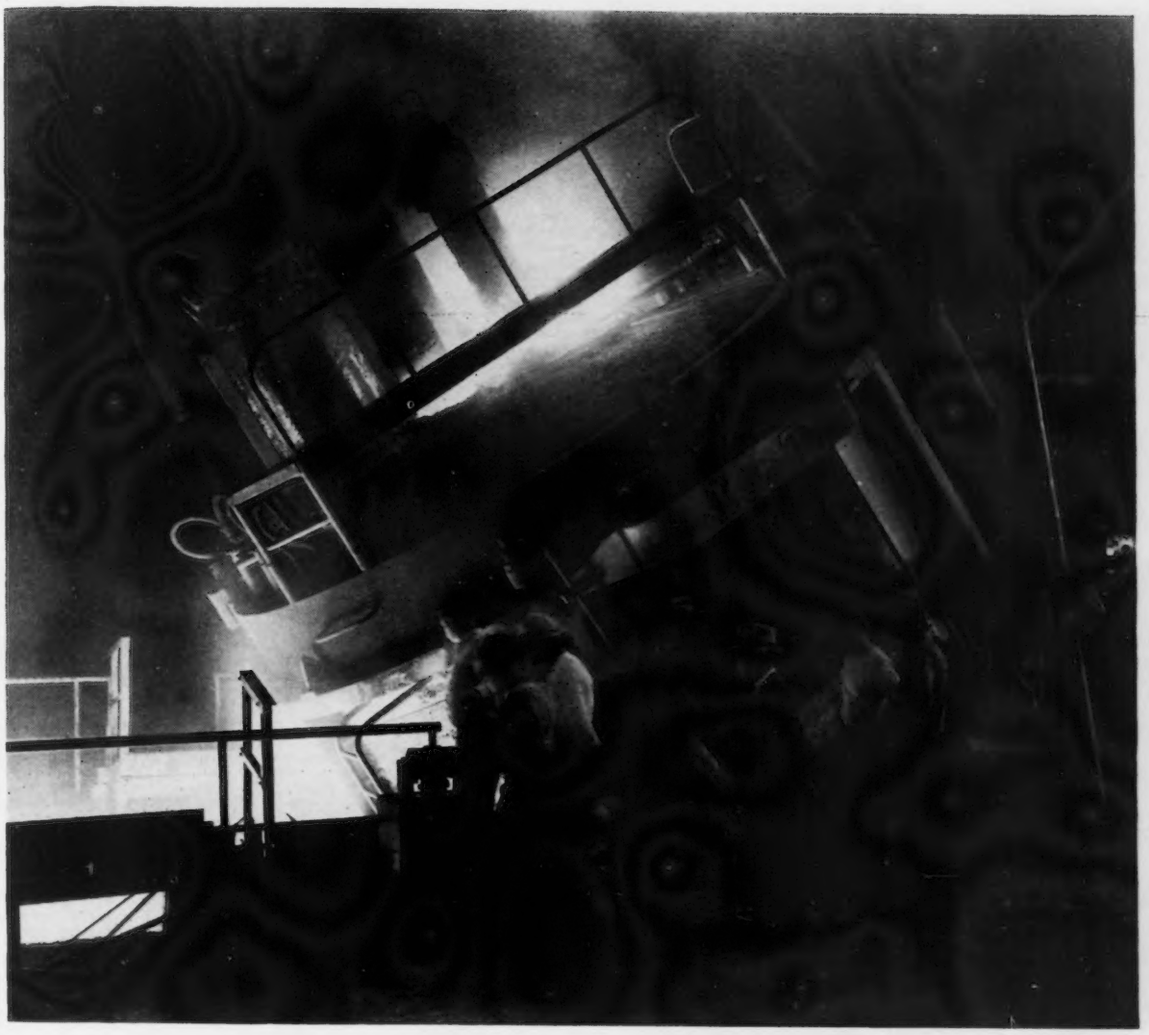
Function of the committees as outlined by WPB Chairman Donald M. Nelson on Jan. 30 is to co-ordinate and correlate the broad programs of all governmental agencies for increasing the supply of essential minerals and metals. The Minerals and Metals Advisory Committee:

War Department: Herbert G. Moulton, consultant to the Resources and Production Division; Navy Department: Lieut. Comm. E. H. Augustus, chief of Materials Branch, Office of Procurement and Materiel; Board of Economic Warfare: Dr. Alan Bateman, chief of Metals and Minerals Division, Office of Imports; Reconstruction Finance Corp.: DeWitt Smith, vice-president, Metals Reserve Co.; Bureau of Mines: Dr. R. S. Dean, assistant director; Geological Survey: Donnel F. Hewett, geologist in charge, Section of Metalliferous Deposits; Bureau of Foreign & Domestic Commerce: Walter Janssen, chief, Metal and Minerals Unit; Office of Civilian Supply, WPB: Stanley Adams, director, metals and minerals division; Office of Production Research and Development, WPB: Dr. C. K. Leith, chief, Metals and Minerals Branch; Facilities Bureau, WPB: Fred Searls, director; Labor Production Division, WPB: Wendell Lund, director; Stockpiling and Transportation Division, WPB: Dr. W. Y. Elliott, director.


WE'D LIKE TO
Emphasize
Our Service!
BUILDING good springs, exactly to your specifications, is what we're expected to do. Furthermore it's what we have always done and will continue to do — to uphold our reputation for quality. But today, the feature we'd like to stress is Accurate Service. It's not the ordinary kind of service you would expect from an ordinary source of supply; that isn't good enough, — today! The service we mean is the kind that's based on the complete cooperation of everyone here . . . in the office . . . in the plant . . . and in the field; not the "take-it-or-leave-it", "best-we-can-do" kind. It's the kind of service that gets things done for you — so you can do your job better and faster — so that we may more quickly return to building things that make life better — not worse.
Accurate service is for you, if you need springs and wire forms.
Get in the Scrap Now!
Accurate Springs
Write for our new Handbook of Technical Data on Springs. No obligation.

ACCURATE SPRING MANUFACTURING COMPANY
3819 W. Lake Street • Chicago, Illinois

RAY GUNS FOR WAR RESEARCH: These electronic "ray guns" are 300,000 volt X-ray tubes which are to be used by the Army to make X-ray pictures of bullets as they crash through steel armor plate. Inside the tubes, electrons produced a tremendous surge of X-radiation that will make a picture in a millionth of a second. The high-speed X-ray machines, first developed in Westinghouse research laboratories, aid military ballistic experts to study bullets in flight; in industry the machines make possible the study of rapidly moving machine parts. L. F. Ehrke, Westinghouse research engineer, is shown examining an unfinished tube.



More Production of Highest Quality

Illustrated is one of the largest top charge type electric furnaces in the United States. This is a 17' diameter, size KT, Lectromelt, and is producing 50 ton heats of highest quality alloy steel.

Lectromelt furnaces of the top charge type produce more steel per man hour. Their use results in savings of power, and electrode and refractory cost. Standard sizes range from 100 ton to 250 pound capacities.

PITTSBURGH LECTROMELT FURNACE CORPORATION
PITTSBURGH, PENNSYLVANIA

MOORE RAPID *Lectromelt* FURNACES

Defense Plant Corp. Awards New Contracts

• • • The following contracts have recently been awarded by Defense Plant Corp.:

General Motors Corp., Detroit, for additional plant facilities in New Jersey, New York and Maryland, at a cost in excess of $1,290,000, making a total commitment of more than $10,850,000.

General Motors Corp., Detroit, for additional plant facilities in New Jersey at a cost in excess of $730,000, making a total commitment of more than $7,275,000.

Tantalum Defense Corp., Chicago, to provide additional equipment in a plant in Illinois at a cost in excess of $60,000, making a total commitment of more than $4,225,000.

Bellanca Aircraft Corp., New Castle, Del., for additional plant facilities at a plant in Delaware, at a cost in excess of $1,375,000.

Aeronca Aircraft Corp., Middletown, Ohio, to provide additional plant facilities for a plant in Ohio, at a cost in excess of $280,000, making a total commitment of more than $1,115,000.

Pacific Aviation, Inc., Los Angeles, to provide additional equipment for a plant in California at a cost in excess of $160,000, making a total commitment of more than $1,110,000.

The Electric Auto-Lite Co., Toledo, Ohio, to provide plant facilities in Ohio and New York, at a cost in excess of $950,000.

American Export Airlines, Inc., New York, to provide facilities in New York, at a cost in excess of $925,000.

McDonnell Aircraft Corp., St. Louis, to provide additional equipment for a plant in Missouri, at a cost in excess of $150,000, making a total commitment of more than $520,000.

Hershey Metal Products Co., Derby, Conn., to provide machinery and equipment in a plant in Connecticut at a cost in excess of $410,000.

Plymouth Steel Co., Detroit, to provide plant facilities in Michigan.

General Motors Corp., Detroit, to provide additional equipment for plants in Ohio, Tennessee and Michigan, at a cost in excess of $9,925,000, making a total commitment of more than $27,000,000.

Southern Acid & Sulphur Co., Inc., St. Louis, to provide plant facilities in Texas at a cost in excess of $700,000.

American Type Founders, Inc., Elizabeth, N. J., to provide plant facilities in New Jersey at a cost in excess of $520,000.

Air Reduction Sales Co., New York, to provide additional plant facilities in California at a cost in excess of $40,000, making a total commitment of more than $190,000.

Curtiss-Wright Corp., Buffalo, to provide additional plant facilities in New York at a cost in excess of $4,000,000, making a total commitment of more than $36,900,000.

S.K.F. Industries, Inc., Philadelphia, to provide additional plant facilities in Pennsylvania at a cost in excess of $3,000,000, making a total commitment of more than $12,000,000.

New Jersey Powder Co., New York, to provide plant facilities in New Jersey at a cost in excess of $9,650,000.

Commercial Shearing & Stamping Co., Youngstown, Ohio, to provide additional equipment for a plant in Ohio at a cost in excess of $435,000.

Central Specialty Co., Ypsilanti, Mich., to provide additional equipment for a plant in Michigan at a cost in excess of $126,000.

H. K. Porter Co., Inc., Pittsburgh, to provide equipment for a plant in Pennsylvania at a cost in excess of $100,000.

General Motors Corp., Detroit, to provide additional equipment in plants in New York at a cost in excess of $5,600,000, making a total commitment of more than $92,000,000.

Standard Oil Co. of California, San Francisco, to provide plant facilities in California at a cost in excess of $6,200,000.

Douglas Aircraft Co., Inc., Santa Monica, Cal., to provide additional facilities at a plant in California at a cost in excess of $3,890,000, making a total commitment of more than $6,135,000.

Kalunite, Inc., Salt Lake City, Utah, to provide additional facilities in Utah at a cost in excess of $990,000, making a total commitment of more than $4,500,000.

Boeing Airplane Co., Seattle, Wash., to provide additional equipment in a plant in Washington at a cost in excess of $2,300,000, making a total commitment of more than $2,800,000.

Rohr Aircraft Corp., Chula Vista, Cal., to provide additional facilities in California at a cost in excess of $640,000, making a total commitment of more than $2,500,000.

Weston Electric Instrument Corp., Newark, N. J., to provide additional plant facilities in New Jersey at a cost in excess of $690,000, making a total commitment of more than $1,850,000.

Clifford Mfg. Co., Boston, to provide additional facilities in a plant in Massachusetts at a cost in excess of $275,000, making a total commitment of more than $1,535,000.

Royal Typewriter Co., Inc., Hartford, Conn., to provide additional equipment for a plant in Connecticut, at a cost in excess of $275,000, making a total commitment of more than $1,400,000.

National Carbide Corp., New York, to provide plant facilities in Kentucky at a cost in excess of $280,000.

Detroit Broach Co., Inc., Detroit, to provide additional machinery in a plant in Michigan at a cost in excess of $37,000, making a total commitment of more than $260,000.

Accuracy is essential

1 IN SNAP GAGES

2 IN ABRASIVE SURFACE GRINDERS

But accuracy—either in a gage or a surface grinder—isn't something that "just happens!"

Whatever the product, it is safe to say that "accuracy" depends upon design, materials, workmanship, and supervision.

The founder of this Company started in 1916 with a sound idea for building an accurate Surface Grinder. Improvements made since that date in "Abrasive" Surface Grinders have been the result of constantly expanding experience which has led to better design; use of better materials as they have become available; improved workmanship; and the most careful supervision of every operation.

We are confident you will be as pleased, as thousands of other users, with "Abrasive" accuracy.

Catalogs describing any of these three machines illustrated will be gladly furnished, address—

NO. 1½ HAND-OPERATED SURFACE GRINDER

NO. 34 VERTICAL SPINDLE SURFACE GRINDER

ABRASIVE MACHINE TOOL COMPANY

Dealers in Principal Cities

EAST PROVIDENCE · · · RHODE ISLAND

AMERICAN Phillips Screws

★ ★ ★

HELP UNSKILLED WORKERS GET SKILLED RESULTS WITH STRAIGHT, STRONG, SPEEDY FASTENINGS

Inexperienced hands catch on quickly to the fastest, easiest, most foolproof method of screwdriving ever devised . . . the self-aligned, non-slip driving of American Phillips Screws. And in no time, new workers develop machine-gun speed that often doubles production. For with American Phillips Screws *they can't miss* . . . because the 4-winged driver and tapered recess form one straight inseparable unit, until the screw has been set up tight. And there's a perfect fastening, with no burrs on the screw head . . . no ugly gouges on the work surface. With this modern method, operators are not tired by work that wore them out, back in the slotted-screw days.

American Phillips Recessed Head Screws are made under rigid laboratory check, and a unique system of piece inspection . . . two good reasons why more and more buyers of Phillips Screws are specifying "American Screw Co. brand."

AMERICAN SCREW COMPANY

PROVIDENCE, RHODE ISLAND

Chicago: 589 E. Illinois Street *Detroit:* 4-258 General Motors Bldg.

4-POINT CONTACT MEANS FAST, STRAIGHT, NON-SLIP DRIVING

COLD-FORGED WOOD SCREWS ★ MACHINE SCREWS ★ SHEET METAL SCREWS ★ STOVE BOLTS

Wire and Cable Reports Asked to Assure Material

Washington

• • • **Wire and cable** companies were urged by the Copper Division, War Production Board, Feb. 25 to submit their reports by the fifth of this month, as instructed.

A number of companies have not submitted their reports by the required date in previous months, and thereby have caused a delay in the processing of the reports for allocation. Hereafter, the Division said, reports will be processed and allocations will be made shortly after the fifth of the month.

There is a distinct possibility, it was pointed out, that at this later date the amount of material available for allocation will be insufficient to take care of the delayed reports.

Aluminized Steel Developed by Armco

• • • **Aluminized steel, a new specialty sheet metal, has been developed by American Rolling Mill Co. for use in products requiring exceptional resistance to heat and corrosion. This aluminum-coated sheet, with a mild steel base, combines the surface advantages of aluminum with the strength of steel.**

Corrosion resistance of the aluminized steel surface is equal to that of an aluminum sheet, according to the manufacturers. When the sheet is exposed to corrosive attack, a tight oxide film, self-healing and inert, forms on the surface. The metal is passive in most atmospheres and resists "pinholing" and temperatures up to 1000-deg. F. without discoloration, the manufacturers say.

UAW Semi-Annual Report Shows $297,937 Total Income

Detroit

• • • **The semi-annual** secretary-treasurer's report of the CIO United Automobile Workers union showed 778,659 dues-paying members during November, and an average of 605,894 dues-paying members for a seven-month period.

The report showed 98 new charters issued during the last seven months, the period covered, and initiations and reinstatements averaging better than 30,000 a month.

Total income for the period amounted to $2,078,565, or a monthly average of $297,937. Expenditures for the seven months came to $2,131,599. As of November 30, 1942, total assets amounted to $864,186, off $154,163 from April 30, 1942.

Financial Statements Reveal More Earnings

• • • **Pittsburgh Coke & Iron Co.** and subsidiary companies reported a net profit of $850,371.14 for the year ending Dec. 31, 1942.

Consolidated Aircraft Corp. reports a net income of $10,323,779 or $8.04 per share for fiscal year ended Nov. 30, 1942, not including post-war refund of $490,136 and after allowing $4,000,000 for post-war adjustments.

Vultee Aircraft, Inc., reports $4,291,140 net or $3.33 per share, for the Nov. 30, 1942, fiscal year, not including $261,900 post-war refund.

Eyes straining into the dark, spindrift blowing back into his face from a smothered wave, faint-edged with phosphorescence—what thoughts are racing in the back of that vigilant face?

A nostalgic thought, of course, for homes whose warmth envelops him a thousand miles away. A new realization of what industrial, all-out production means in terms of safety and victory.

Yes, but behind it all an equally insistent query he will want answered when he comes home to pick up the old threads of his aspirations

Let's file our answer now.

It will be a long answer—more production; more bonds purchased; giving up frills and luxuries; and sound, practical post-war plans that can be put to work quickly when he comes home.

Sound planning will include developing and manufacturing new machines—those ingenious, almost human mechanisms that have helped make America strong, free and democratic.

FIDELITY has been building such machines for 32 years for many industries. Write for your copy of "Facilities."

Designers and Builders of Intricate, Automatic Precision Machines

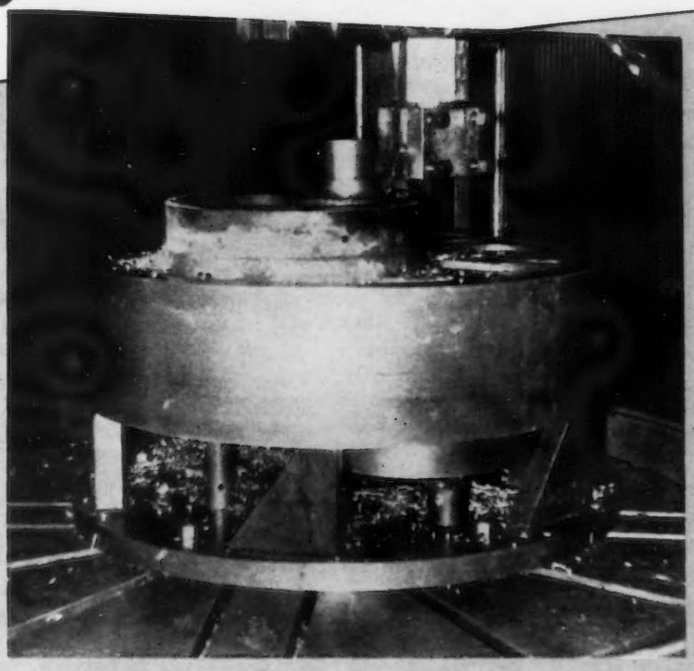
ARMY (E) NAVY

32 YEARS' EXPERIENCE

FIDELITY MACHINE COMPANY

3908-18 FRANKFORD AVENUE, PHILADELPHIA, PA.

if you turn, face, or bore steel



KENNAMETAL* WILL INCREASE YOUR *Production*

STYLE 3 TOOL

KENNAMETAL*

Efficiently cuts HIGH BRINELL STEELS, SCALY SURFACES, SAND HOLES, and WELD SPOTS.

If your shop cannot economically machine steels because the jobs entail cutting through sand holes, weld spots, shaving off scaly surfaces, or taking interrupted cuts . . . get KENNAMETAL immediately.

KENNAMETAL not only slices through high Brinell steels, it consistently increases production on steels of any hardness . . . because of its high transverse rupture strength it takes interrupted cuts at economical feeds and speeds . . . weld spots and rough surfaces are taken off at efficient speeds and feeds.

* INVENTED AND MANUFACTURED IN U.S.A.

The illustration shows KENNAMETAL tools, styles 3 and 6, making a finish turning on an eccentric herringbone power gear for a fluid power pump. It is being machined at a speed of 285 S.F.P.M., with a feed of .024 per rev. The depth of the cut is 5/16 of an inch.

For similar economical performance on boring, turning, and facing operations, use KENNAMETAL. Write for your copy of the new KENNAMETAL Tool Manual which gives complete information about this efficient steel cutting carbide.

McKENNA METALS Co.

144 LLOYD AVE., LATROBE, PENNA.

Trade Mark Reg. U. S. Pat. Off.

Foreign Sales: U. S. STEEL EXPORT CO., 30 Church St., New York (Exclusive of Canada and Great Britain)

KENNAMETAL THE All American CARBIDE

Loss of Scrap Yard Labor Might Reverse Comfortable Inventory Situation

New York

• • • **Analysis of the scrap** situation for 1943 bodes well from the standpoint of supply predicated on the stand that all efforts which were resorted to last year to create scrap flow will again be utilized this year. This means scrap drives must be continued and even enlarged in certain directions due to changing circumstances but the promises are for an adequate supply if this action is taken at the right time.

By Fall of this year scrap demand may be even larger than during the crucial period of last year due to new steelmaking facilities which will then be in operation.

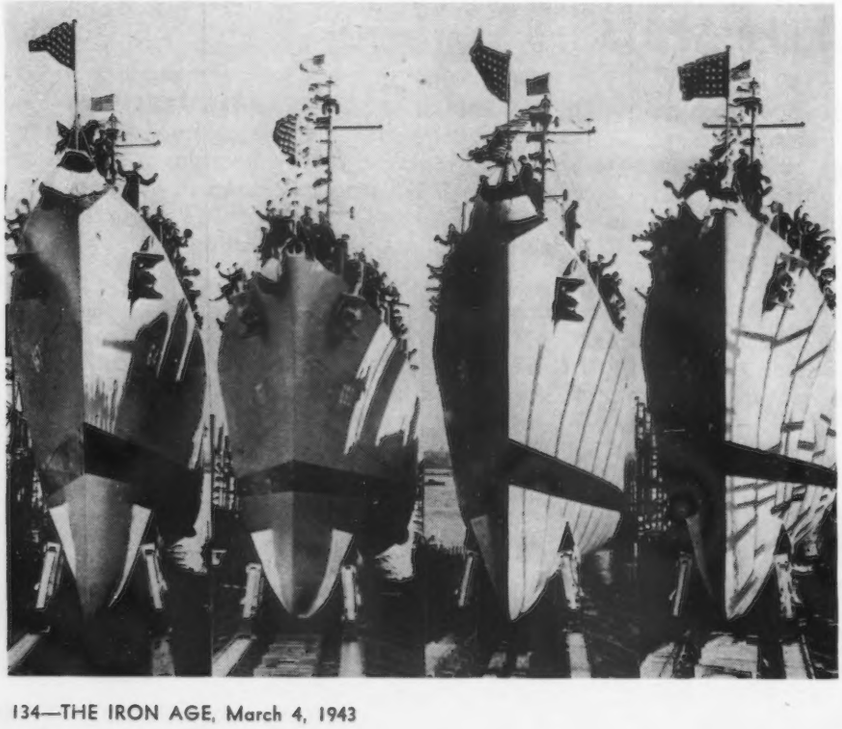
Estimates are affected by many factors, including the completion of much new blast furnace capacity in the same period, the unlikelihood of all planned steelmaking equipment being in operation, the swing to bessemer practice wherever possible and the hopes of getting usable battlefield scrap sometime this year.

The facts are that this year started with a better backlog of scrap, industrial scrap will be produced at a greater rate throughout 1943 and if over-optimism does not kill off civic and industry-wide salvage campaigns, the supply should at least equal the demand. The campaigns are given almost full credit for the increase in backlog felt at the end of last year and it is the consensus that sufficient scrap this year will be the reward of going out and getting it again.

More blast furnace and increased steelmaking capacity will just about neutralize each other so far as the effect on the scrap supply. If weak priorities are not permitted to stymie the expansion program too greatly, blast furnace capacity is expected to increase 20 per cent while open hearth tonnage is scheduled to increase by 18 per cent.

One problem is the forthcoming increase in electric furnace capacity. This has caused serious concern for scrap supplies when at original capacity and believed nearly impossible to supply at this high level.

FOUR DESTROYERS IN 14 MINUTES: A new world speed record of 14 minutes for launching four destroyers was set at Kearny, N. J., Feb. 28, in the shipyard of the Federal Shipbuilding & Dry Dock Co. The destroyers "Thorn," "Bullard," "Turner" and "Kidd" were launched two at a time. They appear, left to right, in the order named in the accompanying picture. This was the third quadruple launching of destroyers in ten months from the yard of U. S. Steel's shipbuilding subsidiary.



The most severe headache is the entirely probable nationwide labor shortage in the scrap trade. So far the Selective Service has done little to solve this problem although recently a bulletin was issued declaring the scrap industry as "essential" and seeming to promise deferment to those in it.

Reports to date on the effectiveness of this order do not show that any particular consideration is being given scrap workers and many yards face closing from lack of help. Laborers, particularly, who have no feasible claim to being key workers, are being siphoned off, according to reports by both the Selective Service and higher paying war plants. Consequently, this represents the greatest labor sore spot as women, for the most part, are incapable of the heavy laboring jobs in a yard. Various machine and crane operators, who could more easily be replaced by women are not leaving the trade quite so rapidly thus neutralizing most of the benefit to be derived from employing women.

Extreme yard labor shortages have already become serious in Buffalo, St. Louis and Detroit and the threat seems likely to spread to every major industrial center. One Detroit yard is said to be employing 11 women some of which are segregating and actually handling material.

Beyond the need for Selective Service protection the trade seems also to need some price aid from OPA to permit paying sufficiently high wages to hold workers. Industry-wide job freezing may be the alternate solution although several Detroit manufacturers report that the local job-freeze there has not been fully successful.

A sharp rise in the number of blast furnaces laid up for repairs after their long and steady production campaigns might also alter the scrap supply picture by putting more pressure on suppliers.

One of the most promising signs in the electric furnace picture is the increasing amounts of low-phos-low-sulphur plate scrap and structural croppings originating in shipyards and prefabricating shops. Auto graveyards, while expected to operate below their 1942 level this year, can also add perceptibly to this badly needed supply by holding out frames and similar material for electric furnace consumption.

The greatest single factor in building up our scrap backlog, however,

was the success of the various local and nationwide salvage drives for farm and household scrap, socalled demolition scrap which flowed through the efforts of the Special Projects Division of WPB, and the results of the hard drives conducted within industry by various steel and warehouse salesmen's groups. Much of the finest heavy melting material collected last winter came from this latter group's efforts.

That scrap drives will not and cannot be eliminated this year is indicated strongly in WPB collection quotas for the first six months. About 17,000,000 tons were collected in the last six months of '42 and the new quota for the first six months of this year will total 14,500,000 tons. This appreciable drop is based on the belief that some sources of scrap have been depleted and the necessary extra margin is expected to come from production scrap which is increasing in quantity, if not in usability, at a fast rate.

Last year about 55,000,000 tons of scrap of all kinds were consumed of which about 24,000,000 tons came from salvage drives and 31,000,000 tons was production and recycled scrap and, of course, railroad scrap. If the WPB reaches its collection goal for both halves of this year, a possible 28,000,000 tons will be available from salvage sources and with peak capacity finishing mill operations and increased shipyard and war plant schedules the additional requirements should be self productive.

A lesser factor in the supply picture which has grown perceptibly in the last six months and should continue somewhat this year has been the increased number of slag reclamation projects in the nation many of which are producing satisfactory tonnages from an otherwise lost source. More than a dozen such plants are being operated for steel producers by a single concern and it is believed that at least 25 reclamation plants are producing from 50- to 65,000-tons of reclaimed metal per month. These are operated only on dumps containing from 12 to 18 per cent metallic content and capable of producing from two to three thousand tons of reclaim per month. Hence, it is conceivable that upwards of ¾-million tons of scrap charge may be produced by this method this year.

Another promising sign for the scrap supply for this year is seen in the increased return of battlefield scrap and import of foreign scrap from friendly countries. With the completion recently of the 1000th Liberty ship and the consistently high production rate of the shipbuilding industry plus promised greater submarine protection, available bottoms are expected for employment in this activity.

One of the greatest difficulties to date in getting in the foreign scrap has been the necessity for turning boats about rapidly to get a greater number of trips per month. The shortage of bottoms accounts for this hurry which has so far obviated the opportunity for loading scrap in foreign ports. Another factor, tied in closely with the time element, has been the lack of preparation facilities for scrap which would help to concentrate the cargoes.

Both of these difficulties are being ironed out, first by the shipbuilding industry producing the number of bottoms required at a rapid rate of speed and through the Navy's efforts to produce scrap preparation facilities.

It is becoming well known that the Navy is recruiting trained scrap men to organize scrap preparation squadrons for all foreign ports. With this fact it also seems likely that the Navy working with the Maritime Commission will take over full responsibility for the return of scrap to this country. Moreover, the returned scrap will be fully prepared and segregated, it is presumed, and thus ready for the furnaces. How great these tonnages will be is also due for conjecture but is seen as a promising assistance.

o o o

Alloy Turnings Consumption May Be Geared to Mills' Monthly Ingot Output

Cleveland

• • • **Alloy turnings,** of which there are produced in the United States approximately 100,000 tons a month, have been more or less a headache to alloy steel producers and to scrap dealers and brokers, since difficulty has been witnessed in disposing of them to mills. For some months serious consideration has been given by WPB to various means of utilizing turnings, but finally the proposition of requiring alloy manufacturers to purchase a certain amount of turnings monthly, based upon the production of alloy steel, is about to be issued as an order. This idea has been previously mentioned in THE IRON AGE, but confirmation is now imminent.

It is expected that within the next week or so, an official order will be forthcoming to this effect. The amount of turnings that must be purchased is expected to be 8 per cent of the monthly alloy ingot production tonnage. For example, a producer of alloy steel that had a 50,000-ton output in March would be required to use 4000 tons of turnings.

To the large alloy producer this order is not expected to make a great deal of difference, since many of them are using far in excess of 8 per cent of their monthly ingot production. However, many of the smaller producers have been avoiding the use of turnings as much as possible, often not using any. The order is designed to make the use of turnings universal and equitable. Naturally, large producers are not expected to reduce their turning consumption because of the 8 per cent requirements and it is quite likely that provisions of the order will prohibit such a reduction.

o o o

Turnings Problem At Detroit Analyzed

Detroit

• • • **Here are major** aspects of the problem of disposing of light alloy turnings as they are seen in Detroit, prime turnings production center of the country, and in other important machine shop areas—

1. The market prices on turnings are weak, a few transactions having taken place on long turnings since the first of the year at a dollar or more under ceiling prices. But there is no general expectation that the price will actually break, because (a) movement of a fair amount of turnings by allocation at ceiling prices imposes a steadying condition on the market, putting handlers along the way in a "long" position, desirous of maintaining the price structure to

protect purchases already made; and (b) the government is interested in holding prices up, in fear that the segregation facilities it has imposed on producers will be found too expensive to continue if income is lessened.

2. Three-way alloy turnings are simply not wanted by open hearth and electric furnace operators at any price, and two-way alloys are little better off in the market, due to difficulty of heat specification maintenance in using them. Stainless steel turnings are in equally poor demand.

3. Dealers are showing a reasonable reluctance to handle turnings, even from regular sources, unless allocations accompany them, due to difficulty in finding a home for them.

4. In the light of this dealer reluctance, some producers of scrap are wondering why they should send their output through dealers at all, inasmuch as the bulk of it goes out on allocation anyway, and when dealers do not want to handle the remainder, the less desirable production, they "are not fulfilling their service function." (One important producer did not send out any lists in February, in protest at the situation).

5. Briquetting or crushing does comparatively little to increase the desirability of unbaled alloy turnings. Briquetting, a difficult operation on turnings, is being used mainly in Detroit district for cast material; crushing facilities are being employed to the limit, to take advantage, not only of the $2 premium on short turnings, but also of a very slightly better acceptance for that grade.

6. There is some hope that as the present good-sized stockpiles of good quality scrap are worked off, and as the mills come closer to the need of piling up new stores for the 1943-44 winter, turnings will move better.

Last week, on page 83, THE IRON AGE *presented problems which face steel mills in the use of turnings.*

But this last viewpoint is a hope only, and there is no optimism apparent in Detroit. Some quarters take the gloomy view that the only way out of the situation is to forget entirely about segregation and ship directly to blast furnaces.

Nevertheless, some circles see an inevitable chain of events progressing to the point where mills will flatly refuse to take turnings, regardless of government pressure or directives, due to increasing numbers of off-heats and practical difficulties in handling the wide variety of classifications resulting from segregation. This will be true, some predict, unless the practice recently described in THE IRON AGE, of ordering steel by performance standards rather than metallurgical composition, spreads.

It is figured in Detroit that if the government does direct that a certain proportion of turnings be used in every heat, the order will call for average use rather than specific quantity per heat. "Unless that is done," said one well-posted analyst, "practically every heat will be an off-heat."

Meanwhile, the problems continue. A February list of scrap included 75 cars comprising no fewer than 28 classifications, mainly due to turnings segregation. Imagine having to use those cars, from left to right, and coming out at the end of a series of heats with the chemical compositions ordered!

SHORT CUT to swifter production

"Buffalo" AIRCRAFT BENDING ROLLS

The exceptional simplicity and ease of control of "Buffalo" Aircraft-Type Bending Rolls are vital factors in today's rapid plane production. Eliminating many slow, laborious manual operations, these bending rolls are accurately turning out a wide variety of circular forms—even with unskilled operators. Designed to meet aircraft manufacturers' requirements, with a wide range of speeds, Buffalo Aircraft Type Bending Rolls are on the job day and night helping meet delivery schedules.

ARMY E NAVY

BUFFALO FORGE COMPANY

492 BROADWAY BUFFALO, N. Y.

Branch Engineering Offices in Principal Cities

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

FREE New Booklet helps solve handling problems

Quick Answers to important questions like these

Am I eligible for an industrial truck or tractor under W. P. B. Limitation Order L-112? How do I go about ordering? What equipment is available? When can I expect delivery? Which type of equipment will best serve my needs?

For the vitally important job of keeping materials moving in your plant, you'll find invaluable the data contained in the new Mercury Reference Catalog.

Written specifically for the busy handling executive, and based upon the combined experience of leading material handling engineers, the book quickly and specifically presents factual information on the most modern material handling methods.

Every executive concerned with materials handling will profit from a study of this booklet. Write for your free booklet today.

MERCURY

TRACTORS · TRAILERS · LIFT TRUCKS
MANUFACTURING COMPANY
4144 South Halsted Street, Chicago, Illinois

New Scheduling Order Controls Production of 34 Major Components

Washington

• • • A new general scheduling procedure for controlling production of important component parts which is said to tie-in well with the procedure required under CMP, was announced last week with the issuance of General Scheduling Order M-293, covering critical common components.

The order establishes three classifications of relative urgency for the 34 major components which have presented an obstacle to efficient capacity war production. It requires that manufacturers of critical components must make operation reports to WPB in the case of each of the three classifications of urgency. These are the only requirements applicable to the largest class of components.

In the second class, in addition to filing the operation reports, manufacturers are required to report delivery schedules for specific periods which must be approved by WPB. Deliveries will be made, regardless of preference ratings assigned to such materials.

In the case of the third class of components, which class includes seven most critical items, persons seeking to place orders for them are required to receive specific WPB authorization to place such order. In addition, WPB may direct the firm with which such order is to be placed. In the case of these components, WPB feels that the direction of firms to receive orders will eliminate much competition among users of the critical items for them, and provide an orderly process for obtaining them.

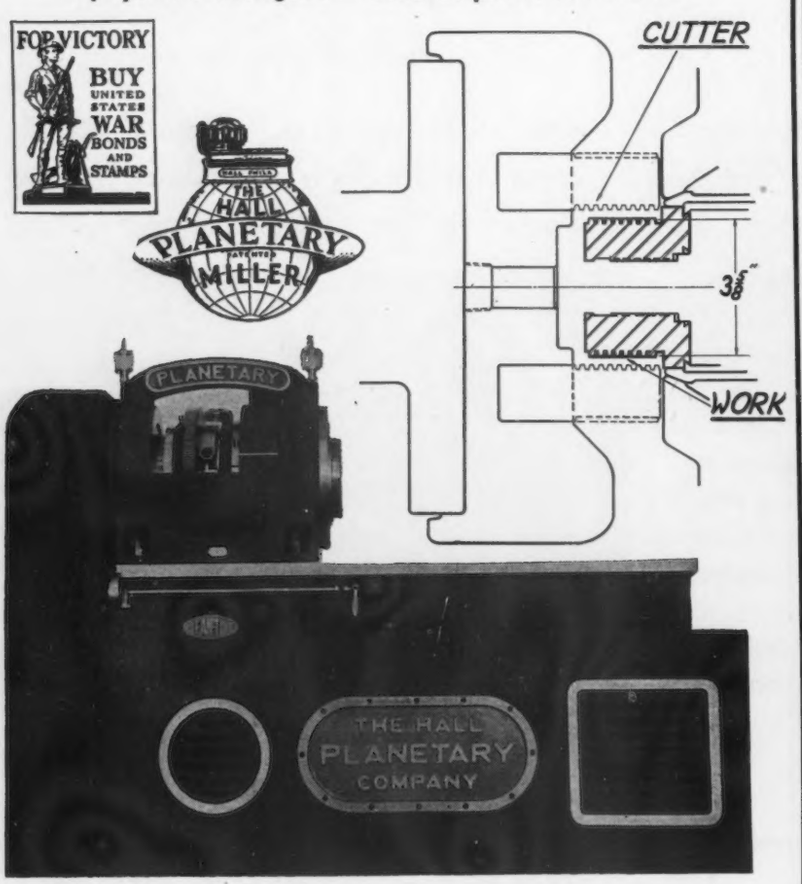
Orders placed at the direction of WPB must be accepted by the manufacturers with whom they are placed.

PLANETARY

PLANATHREAD THIS PART IN 6 MINUTES

HIGH PRODUCTION — LOW COST
OTHER OPERATIONS AND SIZES IN PROPORTION

It pays to investigate — Send us prints for details



HALL PLANETARY CO.
FOX & ABBOTSFORD AVE., PHILADELPHIA, PA.

STEEL TREAD: Designed to prevent skidding on snow and ice, a new type airplane tire whose tread comprises thousands of steel-wire spirals in each tire has been announced by the Goodyear Tire & Rubber Co. Embedded directly into the tread of each tire, the wire spirals supplement the tread's non-skid function.

Green worker—but he's safe!

He's a new man in a vital war plant . . . working long hours . . . sometimes forgetting to be careful. Here is a real job for "A.W." Rolled Steel Floor Plate—to stop the alarming increase in slipping and falling accidents, to end floor troubles for good. "A.W." Floor Plate protects men essential in the war effort wherever they may be. Fire-proof, heat-proof, oil-proof, crack-proof. Write for folder.

Other products include Plates, Sheets, Billets, Blooms, Slabs—Carbon, Copper or Alloy analyses.

ALAN WOOD STEEL COMPANY

MAIN OFFICE AND MILLS: CONSHOHOCKEN, PENNSYLVANIA : SINCE 1826. District Offices and Representatives: Philadelphia, New York, Boston, Atlanta, Buffalo, Chicago, Cincinnati, Cleveland, Denver, Detroit, Houston, St. Paul, New Orleans, Pittsburgh, Roanoke, Sanford, N. C., St. Louis, Los Angeles, San Francisco, Seattle, Montreal

provided regular prices and terms are met. After receiving such an order, a manufacturer shall be required to make delivery in accordance with the WPB approved schedule, specifying delivery dates, regardless of preference ratings assigned on other items which he is producing.

The order also gives WPB additional powers to channel critical components for major war needs. When urgent problems arise, WPB is empowered to take steps to increase production. It may direct the return or cancellation of any order for critical components on the books of any manufacturer. It may direct changes in delivery and production schedules and it may allocate an order from one manufacturer to another. It may revoke any authorization to place an order and take such other steps as it deems necessary with respect to placement of orders for, or the production or delivery of, critical common components. Purpose behind the order is to coordinate deliveries of raw materials and complete the processing into an evenly functioning operation for war production.

All producers will be required to file three separate reports about the third of each month. The first report will concern unused capacity to produce. The second report will indicate, in terms of dollar value, the orders received, filled, and unfilled, at the end of the previous month, together with a statement of orders expected to be shipped during the following month. In addition, a third report will require the submission of pertinent information required for the coordination of the scheduling plan with the Controlled Materials Plan.

The second and third lists of critical components, on which special information, in addition to the above, is required, are as follows:

TYPE X

Aluminum forgings	No change
Crankshafts	
Diesel engines	
Gasoline engines	
Fans and blowers	No change
Compressors	No change
Heat exchangers	No change
Pumps	
Turbo-blowers	No change
Electric motor control	
Pressure vessels	
Jewel bearings	No change
Turbines	No change
Circuit breakers	
Power boilers	No change
Radio test equip.	
CO_2-extinguishers	
Machine tools	No change

TYPE Y

Machetes	
Compressors	No change
Heat exchangers	No change
Turbo-blowers	No change
Jewel bearings	No change
Radio test equip.	
Machine tools	No change

They're shooting the works ... and they're relying on us

The men in our armed forces are giving everything they've got to this fight for freedom—and they're depending on us back home to supply the tools of war.

One way to help maintain war production at full capacity is to use quality packings, gaskets and oil seals—and use the proper material for each requirement. A GARLOCK representative will be glad to advise you. Call him in!

THE GARLOCK PACKING CO., PALMYRA, NEW YORK
In Canada: The Garlock Packing Co. of Canada Ltd., Montreal, Que.

GARLOCK

Mower Named Director Of WPB Container Division

Washington

• • • **Roswell G. Mower** has been appointed director of the WPB Containers Division to succeed Charles L. Sheldon who has resigned. Mr. Sheldon will return to the Hood Rubber Co., Watertown, Mass., where he is purchasing agent. Mr. Mower came to WPB in July, 1942, as a special assistant to the Director and was made deputy director in December. He is vice-president of the Manz Corp., Chicago, color and catalog printers.

E. F. Tomiska, assistant director, has succeeded Mr. Mower as deputy.

Allan L. Brack, chief of the fibre section, has succeeded Mr. Tomiska as assistant director.

THERE IS ONLY SO MUCH TOOL STEEL AVAILABLE!

Every time a tool is broken, that tool must be replaced if production is to continue. Today, it takes as much as six months to obtain tool replacements.

One of a series of 2⅓ by 3½ ft. 3-color bi-monthly posters, designed to help reduce tool breakage through worker education, made available to users of **"TOMAHAWK"** tools, without charge.

For complete information wire or write

GENESEE TOOL COMPANY
FENTON, MICHIGAN

* Registered Trade Mark

CMP-6 Ban Explained In New CMP Manual

Washington

• • • **The CMP accounting** manual to aid contractors in keeping proper records of their allotments under CMP previously described in the Feb. 25 issue of THE IRON AGE was actually issued by WPB on Feb. 27.

Due to the fact that the Form CMP-6 was eliminated while the accounting manual was in preparation, WPB has thought it necessary to use a preface note describing the effects of the elimination of the form as it relates to the use of the manual. This preface reads as follows:

"Since the Consumer Allotment Accounting Manual went to press, Form CMP-6, "Controlled Material Purchase Authority," has been eliminated by amendment to CMP Regulation No. 1.

"This does not alter or change the principles of record keeping and accounting as set forth in this Manual. The new procedure requires that the information formerly placed on CMP-6 be endorsed on the purchase order for the controlled materials being procured. In the illustration of "Sample Entries on Allotment Cards," Exhibit A, the quantities shown on the steel purchase authority, CMP-6, are noted on the purchase order and posted to the allotment card without the preparation of CMP-6.

"Also in the 'Distribution of an Allotment,' Exhibit B, copies of CMP-6 are no longer required provided the appropriate information is endorsed on the purchase order.

"A Purchase or Delivery Order placed pursuant to an allotment received has the status of an authorized purchase authority if properly endorsed with the appropriate allotment number covering the quantity of material being procured. Orders requesting delivery of controlled materials from mills and warehouses need not be accompanied by Form CMP-6 under the latest revisions of CMP Regulation No. 1."

•

Alloy Producers May Consume 8% Turnings

Washington

• • • **The WPB** Alloy Steel Advisory Committee has concurred in a proposed amendment to M-21-A requiring alloy steel producers, except makers of tool and stainless steel, to purchase alloy steel turnings whose accumulation in the market has created a problem. The amendment, now being circulated in the Steel Division for criticism and comment, would require alloy producers to purchase turnings equivalent to 8 per cent of their monthly alloy ingot production. M-21-A restricts tool agreement deliveries and regulates delivery and alloy content of alloy iron and steel.

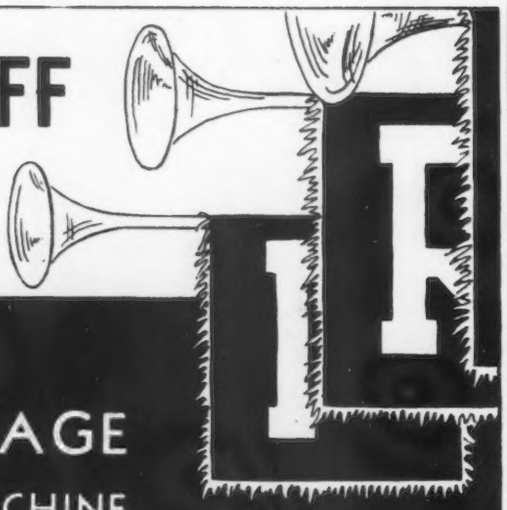
•

Hand Tools Reduced

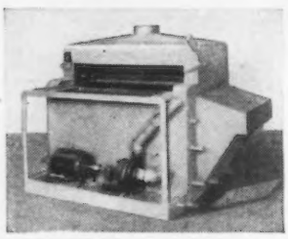
• • • **In a move to reduce** inventory stocks of heavy forged hand tools in distributors' and dealers' hands, the WPB last week issued Appendix A to Schedule IV of Order L-157, as amended, further curtailing the number of products permitted to be manufactured.

The net result was to reduce by more than 20 the number of products approved for manufacture, which total had been decreased from approximately 1150 to less than 360 under the original order and amendments.

RANSOHOFF PRESENTS



A NEW SINGLE STAGE WASHING MACHINE



Highly-machined Surfaces Are Protected

This machine is equipped with a special carriage consisting of V-shaped brackets. Note: the section of the brackets contacting the work is brass-lined to prevent scratching of the most highly machined surfaces.

Also equipped, if desired, with perforated baskets for delicate small parts.

for sub-contractors

• • • •

for makers of complete units

SPECIALLY designed and built to meet the demand for a fast-acting, thorough-cleaning machine to remove oil and chips from machined shafts of standard or special shapes during inter-process operations . . . also, to remove rustproofing oils before assembly on parts shipped from sub-contractors.

Machine shown here is working out with remarkable results in a plant devoted to making military tanks.

Get in touch with the RANSOHOFF ENGINEERS for equipment for washing, rinsing, drying, rustproofing, parkerizing, bonderiting, burnishing, sawdust polishing.

N. RANSOHOFF, Inc. 1315 Township Ave. CINCINNATI, O.

Read the WAR NEWS before it happens

Tomorrow's battle headlines are being written in today's production records. And wherever Veeder-Root Counting Devices are installed, these records are being published continuously, in bold black-and-white figures. So any bad news can be corrected long before it gets into serious trouble . . . trouble that so often develops where there is no constant, accurate Control-by-Count.

For all types of war-production machines, you can get Veeder-Root Counting Devices . . . mechanically or electrically operated . . . to count in any terms or units of performance required. And any of these counters can be installed quickly and easily, without disrupting production. If your work counts in war production today, then help to make the war news good tomorrow. *Count on Veeder-Root.*

Keep War-Production Machines in Step... equip them with VEEDER-ROOT COUNTERS

VEEDER-ROOT INC., HARTFORD, CONNECTICUT, U. S. A.

Your Choice of a Scrap Broker is Important

The sale of Iron and Steel Scrap should be—and can be—as satisfactory and pleasant as any business transaction in your plant.

Be sure to choose a broker who can rightfully claim these qualifications—

1. A reputation for trustworthiness and responsibility.
2. A record of prompt payment and readiness to adjust differences without quibbling.
3. A willingness to give extra service—such as keeping customers posted on the best prices available, finding the best markets for customer's advantage and advising on the technical problems involved.

We guarantee our customers these and other high standards of business relationships.

In our career of nearly 50 years as an iron and steel scrap broker we have built on these principles.

We solicit further opportunities to be of service in the movement of iron and steel scrap from industrial plants, railroads and scrap yards to steel mills and foundries.

The
CHARLES DREIFUS
Company

(Scrap Broker for Nearly Half a Century)

Philadelphia, Pa.
Widener Bldg.
Rittenhouse 7750

Pittsburgh, Pa.
Oliver Bldg.
Atlantic 1856

WORCESTER, MASS.
Park Bldg.
Worcester 6-2535

NE Specifications Standardize and Limit More Products

Washington

• • • **In the second round** of a battle to simplify and standardize steel products so that greater production efficiency and less complicated inventories can be obtained, the WPB issued on Feb. 25 National Emergency specifications limiting the variety of shapes and sizes of structural shapes, steel axles and forgings, mechanical steel tubing and rail and track accessories.

These specifications embodied in Schedules 4, 5, 6, and 7 of order L-211 define the varieties and shapes, compositions, types, grades and qualities which may be produced and delivered of these products. The order is effective immediately. WPB had previously taken similar action on reinforcing steel, railroad and transit wheels and tires, barbed wire and fencing, poultry netting and poultry flooring. Still more far reaching schedules of the same type are said to be in preparation.

In addition to increasing mill production and easing the inventory situation with relation to these products, WPB states that the action should also simplify buying for foreign purchasers. Opinions have been expressed in the steel industry for a good many years to the effect that simplification would be desirable to rid the industry of hundreds of specialized requirements which have accumulated over the years. Both the American Petroleum Institute, dealing with oil country goods particularly and the Society of Automotive Engineers dealing with steel specifications have made similar standardizing moves voluntarily in the past.

The schedule on structural steel shapes (No. 4) limits production to a relatively small number of standard specifications. The list of permissible sizes is one which was put into effect on a voluntary basis with the approval of the Attorney General on Feb. 1, 1942. Selection of specifications covering the needs of the armed forces was made by the services.

The schedule on steel axles and forgings (No. 5) is applicable to those used by railroads and rail transit services. Production of these items must conform to the terms of the schedule. However, production of axles for the repair and maintenance of railroad

we're all for more ice cream

Perhaps you read the story. How one of our submarines recently docked on the west coast with eight tiny flags painted on her conning tower . . . symbolic of her prowess . . . and the first thing the crew asked for was ice cream!

We have a special interest in submarines for Holly piston pin retaining rings are used in their big diesels. The forming operation is very difficult and exacting but we have been told that our rings do an *outstanding* job in maintaining operating efficiency.

Can we help in *your* war effort? We'd like to have more boys asking for ice cream.

Write, wire or better still . . . phone us!

AMERICAN SPRING OF HOLLY, INC.
HOLLY, MICHIGAN

Germans May Make Freak Plane Soon

• • • A new "asymmetrical" plane is claimed to have been found so efficient by the Germans that they are planning to adapt the design for almost all service types of planes. This Blohm & Voss 141 reconnaissance monoplane has the observation turret and cabin for the crew in the right wing, and the engine and controls in the left. The fuselage is directly behind the engine, but not midway between the wing tips. The plane also has a peculiar unbalanced tail assembly which gives the impression that it is lopsided.

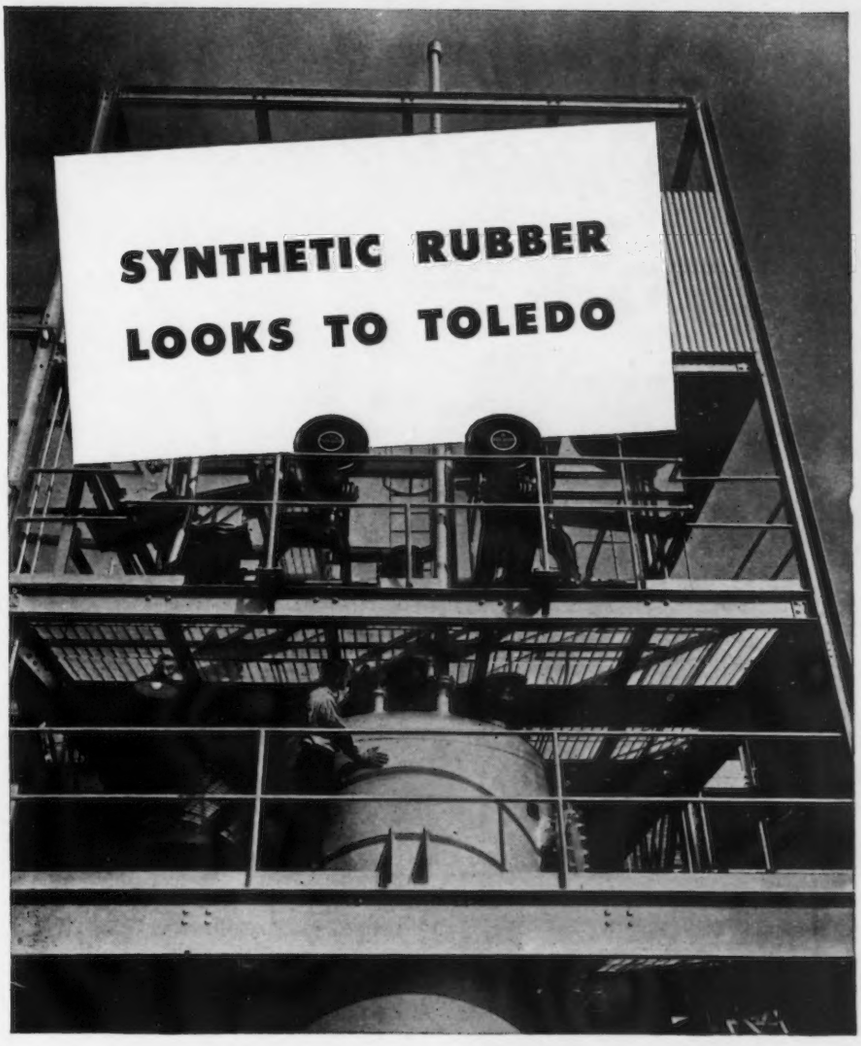
It is reported that German aircraft producers are making ready to start full scale mass production by April 1 after a complete reorganization of the airplane industry, which was started last October. This switchover is believed to be a reply, in part, to the great American and British airplane production.

passenger cars and tenders built prior to today is permitted by the schedule.

The schedule on mechanical steel tubing (No. 6) prohibits the production or delivery of cold drawn seamless tubing made of low carbon steel except on an order for certain minimum quantities. Orders, however, may be pooled for manufacture, if the total of the pooled orders exceeds the minimum quantities shown in the schedule. In addition, the schedule requires that all tubing delivered to warehouses conform to standards of the American Iron and Steel Institute Manual as revised Sept., 1942, or to Army, Navy, or Federal Government specifications. Furthermore, the schedule prohibits production of free cutting tubing containing more than 0.05 per cent sulphur.

The purpose of these restrictions is to establish standard sizes of tubing for jobber or warehouse stocks in order to relieve steel mills of the necessity of rolling small quantities of many different sizes of the product. The limitation on the sulphur content of free cutting grades is expected to eliminate a considerable loss of mill scrap, since sulphur contamination of scrap in machining operations will be reduced.

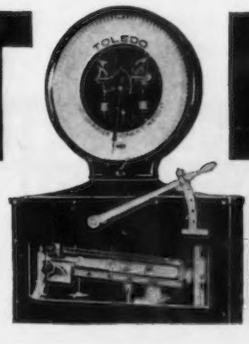
The schedule on rails and track accessories (No. 7) covers production and delivery of new standard tee rails weighing over 60 lb. per yard; plain grooved and guard types of new steel



Tremendously expanded production of synthetic rubber at the plant shown finds Toledo Hopper Scales on the job... to *carefully* and *accurately* weigh out ingredients.

And that's just *one* of countless examples showing how Toledos meet industry's wartime needs... solving today's new problems in weighing, balancing, force-measuring and counting. Whatever *your* weighing problems... for today or the future... get Toledo-engineered and Toledo-built *accuracy, speed* and *dependability.* Write for latest information. Sales and Service in 181 cities. Toledo Scale Company, Toledo, Ohio.

TOLEDO



HEADQUARTERS FOR ALL TYPES OF SCALES

WITH uncommonly strong ELECTRICAL CONSTITUTIONS TOO!

Euclid CRANES and HOISTS

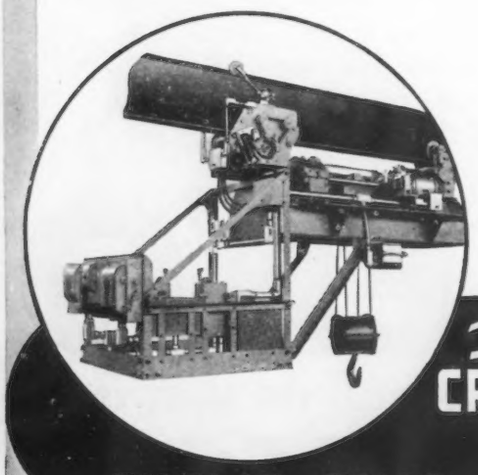
Similar to the blood stream and vital organs of the human body are the electric circuits, motors, controllers, etc. of electric cranes and hoists.

In recognition of their importance Euclid has adhered consistently to a policy of installing "better than necessary" electrical equipment.

The *wiring* of Euclid Cranes and Hoists is heavier, more carefully applied and more thoroughly guarded than that of other equipment. Specially built *controllers* are used. Only first quality *crane type motors* are installed. *Protective devices* for all motors are installed and *every safety factor* for the protection of operators is installed.

To all who may be interested we will gladly explain in detail the various exceptional electrical features of Euclid Cranes and Hoists that provide "*uncommonly strong electrical constitutions*" and are largely responsible for their long life and unexcelled performance.

Write for crane and hoist catalogs and investigate Euclid equipment before placing your next order.



The EUCLID CRANE & HOIST COMPANY

EUCLID, OHIO *Suburb of Cleveland*

girder rails; new steel joint bars; tie plates; track spikes; and track bolts and nuts. An exemption is provided in the case of certain standard length rails for use in the fabrication of frogs, switches, and crossings. Before a manufacturer may deliver such lengths, not conforming to the specifications, the purchaser must certify on the purchase order that they will be used only for the permitted purposes.

All of the schedules permit delivery of products already fabricated, and of those so processed that conformance to the specifications would be impractical.

•

Certification Will Be Simplified by CMP Reg. 7

• • • **Another step in the series** of simplifications of CMP procedures was revealed recently when Harold Boeschenstein, director of the CMP Division of WPB, announced that a forthcoming regulation, CMP Regulation No. 7, would provide a single standard form of certification which may be placed on any delivery order, in lieu of one or more of the varying circumstances by CMP Regulations 3, 4 and 5. The earlier forms, however, may still be used in the appropriate circumstances.

CMP Regulation No. 7, to be issued within a few days, will provide that any delivery order under CMP may be validated by endorsing it or accompanying the order with a certificate, in substantially the following form, signed manually or with a facsimile signature as provided in Priorities Regulation No. 7:

"The undersigned purchaser certifies, subject to the penalties of Section 35 (A) of the United States Criminal Code, to the seller and to the War Production Board, that, to the best of his knowledge and belief, the undersigned is authorized under applicable War Production Board regulations or orders to place this delivery order, to receive the item (s) ordered for the purpose for which ordered, and to use any preference rating or allotment number or symbol which the undersigned has placed on this order."

If an applicable CMP regulation requires that an allotment number or symbol, preference rating or other identification be included in a certification, it must be placed on the delivery order if the form above is used. Use of this standard form will obviate the necessity of placing several different certifications on a single order.

PRIORITIES

Batcheller Adds Aircraft Alloy Steel Section

Washington

• • • An Aircraft Alloy Steel Section has been set up in the WPB Steel Division to help speed deliveries of certain alloy items to aircraft plants, Hiland G. Batcheller, Division Director, announced Feb. 26. The new Section, headed by Louis E. Creighton, formerly vice-president of the Rotary Electric Steel Co. of Detroit, and for many years an operating executive of the Union Drawn Steel Co., will handle problems relating to aircraft alloy steel requirements.

A study of the aircraft alloy situation has just been completed by the Steel Division in collaboration with the Aircraft Scheduling Unit and experts from the steel industry.

Production of alloy steel ingots for aircraft and the many other wartime uses rose in January to 1,260,000 net tons—a new monthly all-time high—and more than 300,000 tons above the 1942 average monthly output. In 1938, alloy steel production averaged only 138,000 tons monthly. By 1944, the nation's capacity for producing alloy steel will be about 1,400,000 tons a month.

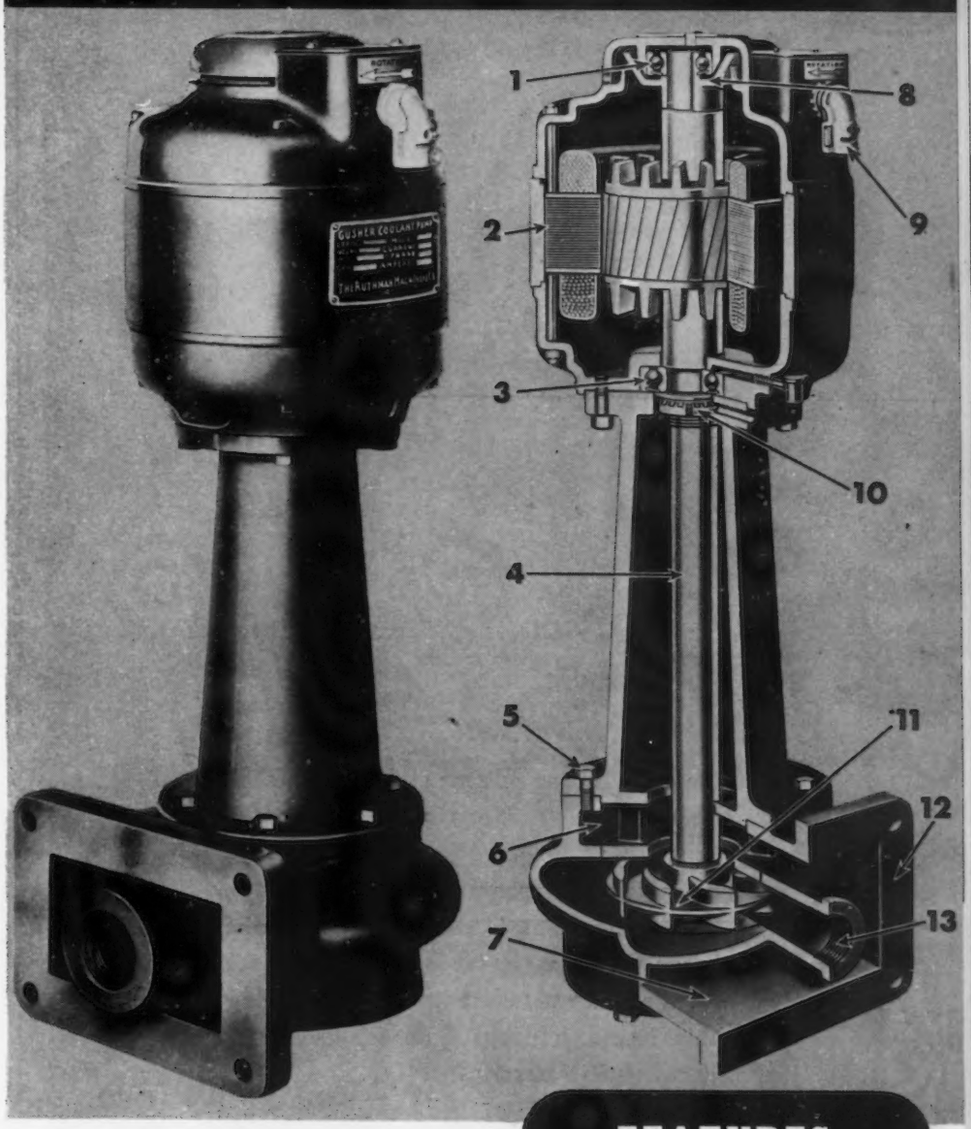
HELICOPTER RETURNS: An Army Sikorsky helicopter hovers motionless above ground while a parcel is handed up. The fuselage, which is without wings, carries two propellers. One is about 36 ft. wide atop the fuselage. The other, about 7½ ft., mounted vertically at one side of the tail. The helicopter can rise or descend vertically, can fly forward or in reverse, shy to either side, spin like a top, or hover motionless.

Press Assn.

RUTHMAN

Gusher Coolant Pumps

THE OUTSTANDING COOLANT PUMP TODAY—



Quite a number of machine tool builders equip their new machines with Ruthman Coolant Pumps. Machine tool builders have doubled their output each year for the past 3 years. And yet even this favorable situation doesn't explain why so many Ruthman Coolant Pumps are made and sold.

The users of machine tools—appreciating the trouble-free performance of Ruthman Pumps—have stepped in and bought Ruthmans as replacements for other coolant pumps. And when they replace with a Ruthman Coolant Pump it's the last replacement they'll have to make.

The RUTHMAN MACHINERY COMPANY
CINCINNATI, OHIO

FEATURES

1 precision ball bearing

2 standard interchangeable stator

3 precision ball bearing

4 rigid one-piece shaft

5 removing these screws permits lifting pump and motor assembly for inspection.

6-7 twin intakes are automatically cleansed when pump is throttled

8 internal louvers and revolving cup disc protect motor

9 conduct wiring connection

10 centrifugal lock nut and seal prevent moisture from reaching bearing

11 double acting impeller

12 heavy mounting flange cast in one piece with impeller housing

13 internal discharge thru center of intake eliminates outside piping

Central Station Operation

R-S Car Hearth Furnaces have been built with motorized door lift, furnace cars and transfer car, all operated from a central control station. The conservation of time and labor in such streamlined installations is readily apparent, particularly when a charge is to be quenched and rapid movement is necessary.

The shop crane is ready to pick up the charge as soon as the car is out of the furnace and there is no time lost in manipulating cables or snatch blocks. Write for details and illustrated R-S Car Hearth Bulletin No. 68-F.

FURNACE DIVISION
R-S PRODUCTS CORP.
4524 Germantown Ave.,
Philadelphia, Pa.

R-S Furnaces of Distinction

ANNEALING · CONVECTION · CAR HEARTH
ROTARY HEARTH · CONTINUOUS CONVEYOR · SALT BATH
FORGING · METAL MELTING · PLATE AND ANGLE HEATING

★ ★ **BUY WAR BONDS** ★ ★

PRIORITIES

P-141 Replaces P-46 For Sanitation Equipment

Washington

• • • **Operating supplies** and maintenance and repair material needed for public sanitation services, heretofore provided under Order P-46, in the future will be taken care of under Order P-141, WPB announced last Saturday. The new order was made necessary by the revocation of P-46, which covered maintenance, repair and operating supplies for public utilities. To provide for the needs of public utilities other than public sanitation services and communications, the Office of War Utilities on Feb. 24 issued Order U-1.

P-141 makes no substantive change from P-46 except to raise the ratings in line with those incorporated in U-1 and to omit certain portions of P-46 which were applicable only to utilities.

Subject to certain restrictions and limitations in the order, which follow the lines of those in P-46, the following ratings have been applied: (1) AA-2X for deliveries to an operator of public sanitation facilities, of materials for maintenance and repair, and for operating supplies; (2) AA-1 for deliveries needed to repair facilities in event of an actual breakdown or to make reasonable advance preparations for making such repairs; and (3) AA-5 for deliveries of materials required for protection against sabotage, air raids or other hostile acts provided such protection is ordered by an authorized federal or state agency.

•

Use of Materials Stopped In Texas Natural Gas Fields

• • • **Effective immediately,** Petroleum Administrative Order No. 9, issued on Feb. 24, prohibited the use of any materials to drill, complete, or provide additions to any well in any discovered or undiscovered natural gas field in Carson, Collingsworth, Gray, Hansfield, Hartley, Hutchinson, Moore, Potter, Sherman or Wheeler counties, Texas.

PAW may issue exceptions to the present ban on the use of materials in the field. Applications to use material to drill, complete, or provide additions to any well must be made by filing a letter in quadruplicate or by sending a telegram to the Director of the Natural Gas and Natural Gasoline Division, Petroleum Administration for War, Interior Building, Washington, D. C., Ref. PAO No. 9.

PRIORITIES

First Order Issued By WPB's War Utilities

Washington

• • • WPB's recently created Office of War Utilities, which administers war activities of electric, gas, water, steam and communications utilities, last week issued its first basic order, U-1, which governs the flow of materials into the entire utilities field with the exception of communications. This is the first industry order to be integrated with CMP. The order replaces the former P-46 and all of its amendments and supplements, reenacting most of the P-46 provisions.

An important group of provisions within the order, designed to effect sharing of material and equipment in utility inventories, requires utilities to sell surplus stocks as a condition for continuing to receive priorities assistance. These provisions are linked with the creation of regional surplus stock offices, to be in operation throughout the United States next month, through which utilities will carry on the redistribution of their surplus materials and equipment.

•

WPB Regions to Handle PD-1A's and Construction OK's

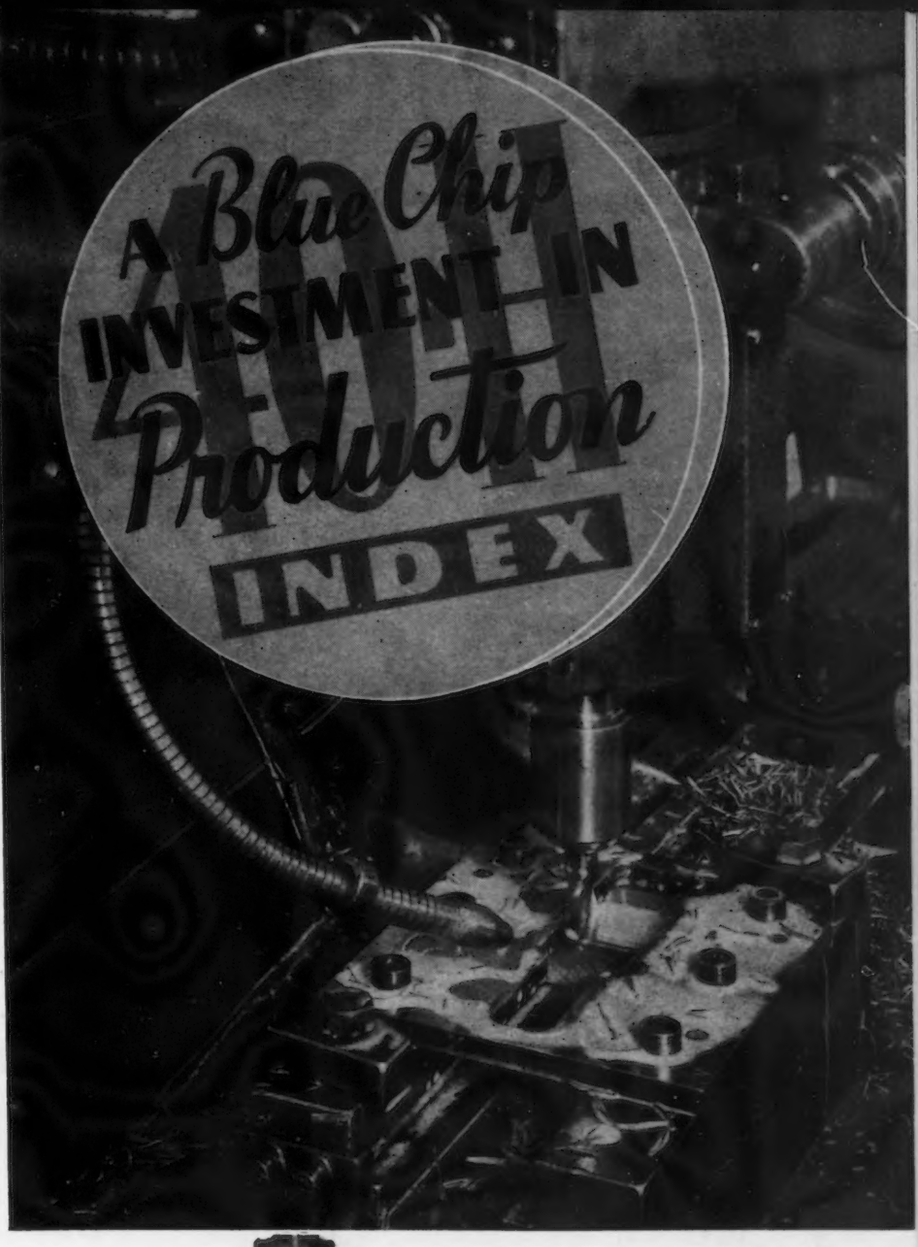
Washington

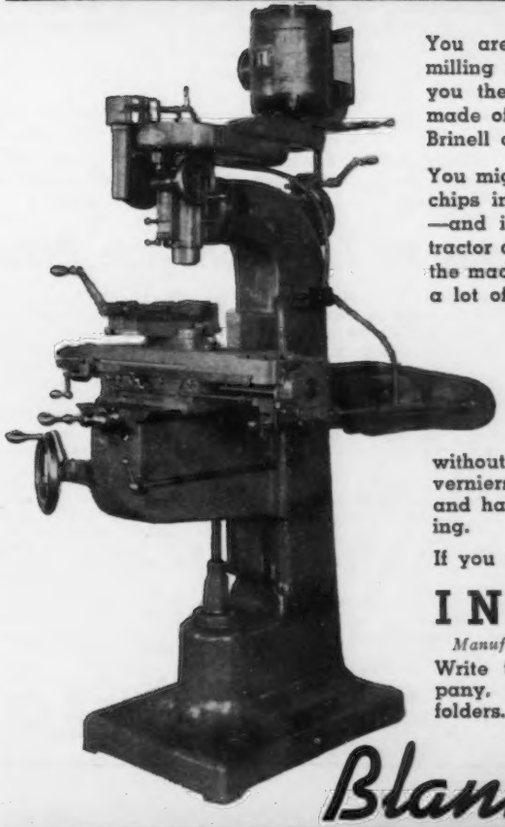
• • • Another step in the decentralization of WPB activities was made public last week, when Donald M. Nelson announced a new administrative order which directs that, after March 1, applications for priority assistance on Form PD-1A be filed with the nearest of the 131 WPB district offices, and authorizes the 12 Regional Offices, beginning March 15, to assign preference ratings on PD-1A certificates to deliveries of materials valued at $100 or less.

Copies of the revised form will be available in WPB field offices after March 1. Major revisions are:

(1) Change from a column-type form, with accompanying instruction sheet, to a block-type question and answer form designed to facilitate application and to reduce to a minimum special requests for additional information; (2) incorporation of the clearance form used in processing the application to speed handling, and (3) addition of some questions not previously asked, to eliminate need for supplemental forms.

In order to allow time for full distribution of the revised form, WPB will continue to process applications filed on the old form until April 1.





You are looking at an Index Mill at work milling out a war part. Sorry we can't tell you the name of the work-piece, but it is made of No. 46-40 pre-hardened steel with a Brinell of 300.

You might guess from the large and uniform chips in the picture that production is good —and it *is*. It suits both the primary contractor and the sub-contractor in whose shops the machine operates. And you know it takes a lot of production these days to satisfy.

Index Mills are a blue chip investment in production and time-savings on milling, drilling and boring. Use Index Mills on tool, die and experimental work, too. They have a ball bearing spindle that runs and runs without relubrication. Are equipped with verniers cross and longitudinal for locating and have power feed to the spindle for boring.

If you do not know about

INDEX MILLS

Manufactured by Index Machine & Tool Company

Write to Blank & Buxton Machinery Company, sales and distribution agents, for folders.

Blank and Buxton

MACHINERY COMPANY • 3100 MICHIGAN AVE., JACKSON, MICHIGAN

After this date only the revised Form PD-1A will be accepted for processing.

Two colors have been used in printing the revised PD-1A yellow to be used in applying for ratings for items which are to be exported without further processing, and white for all others.

Mr. Nelson said that within six weeks more than 80 per cent of all PD-1A applications would be handled entirely by the Regional Offices.

Another order, effective March 8, empowers Regional Offices to authorize construction under Conservation Order L-41, and to assign preference ratings to deliveries of necessary scarce materials to building operations costing less than $10,000, except industrial and certain other listed types of construction.

•

Priestly Quits Alloy Unit

Washington

• • • **J. B. Priestly** resigned last Friday as head of the WPB Steel Division Alloy Unit. Mr. Priestly is vice-president of the Electro Metallurgical Co., New York. The successor to Mr. Priestly has not been named.

WPB Establishes Regional Office in Hawaii

• • • **Coincident** with the return to Hawaiian civil authorities on March 10 of certain functions now being performed by the Military Governor, WPB will open an office in Honolulu to take over the administration of priorities in the Islands, it has been announced by Chairman Donald M. Nelson.

•

Steel Quotas Set For Bed Spring Production

• • • **Calculation** of the base period use of iron and steel in the production of bedsprings is specifically clarified in Order No. L-49 as amended by WPB and announced last week and it also exempts manufacturers of bedsprings parts from the provisions of the order.

Percentages of permitted production and weight limitations per unit remain unchanged. During the two months beginning Feb. 1, the manufacturer is permitted to use in his production of coil, flat, box and fabric bedsprings up to 2½ per cent of the iron and steel used during the base period for the production of coil, flat, and fabric bedsprings, plus 4 1/6 per cent of the iron and steel used in production box bedsprings during the same period.

Since this covers only a two-month period, the percentages are proportionately equal to the previous percentages for the full quarter.

•

Joining Hardware Limited

• • • **Limitations** on the use of iron and steel for manufacture of wood furniture were imposed last week by WPB. The metal restrictions, incorporated in Order L-260, permit the use of iron and steel only for certain specified essential metal parts, principally joining hardware.

•

L-123 Certificates Relaxed

• • • **Purchase orders** for certain repair and maintenance parts of general industrial equipment no longer need to be accompanied by certificates showing that they are exempted from the restrictions imposed by Order L-123, according to the terms of that order as amended by WPB.

This Week's Priorities and Prices

Secondary iron and steel products warehouse maximum prices have been ordered reduced from 10 to 35 per cent in Amendment No. 12 to Revised Price Schedule No. 49, effective March 1. (OPA-1765)

Oxyacetylene apparatus manufacture and sale have been restricted with the issuance of order L-268. (WPB-2645)

New National Emergency Specifications for structural steel shapes, steel axles and forgings, mechanical steel tubing and rails and track accessories have been established. (WPB-2649)

Pig iron prices have been set according to the nickel content in order to provide for increased utilization of nickel-bearing scrap, under Amendment No. 5 to Revised Price Schedule No. 10, effective March 3. (OPA-T-610)

Brass mill product distributors may place purchase orders with brass mills for a specified quantity of brass mill products to be delivered between March 1 and April 1. (WPB-2666)

Form PD-1A, application for preference rating, has been revised, and beginning March 1, all applications must be filed with the nearest WPB district office, not in Washington. (WPB-2685)

■ ■ ■

For copies of above announcements address Office of War Information, Washington, giving announcement number as shown in parentheses after each paragraph. (*For example,* WPB-600 *means announcement* 600 *issued by the War Production Board.*)

Revisions to The Iron Age Priorities Guide

• • • The following data, together with all intermediate weekly revisions in THE IRON AGE, should be added to THE IRON AGE Priorities Guide published with the issue of October 8 to bring the Guide up to date.

Priority Regulations:

No. 11...Amendment revises definitions of maintenance, repair and operating supplies (2-20-43).

No. 11...Interpretation (3-1-43) covers purchase of cranes, monorails and similar items.

"M" Orders:

M-8-a...Amendment relaxes restrictions on cork (2-20-43).

M-9-c...Amended order permits use of copper in manufacture of decorations (2-25-43).

M-15-g...Amended order permits use of preference rating certificate PD-408 to acquire tires for industrial power trucks (2-22-43).

M-81...Amended order permits use of fibre-bodied cans with metal ends by paint manufacturers (2-20-43).

M-81...Interpretation No. 1 (2-22-43) defines frozen tinplate, terneplate and blackplate.

M-199...Amendment restricts use of silver in manufacture of non-essential products (2-25-43).

"P" Orders:

P-86...Revoked (2-20-43).

P-141...Order controls operating supplies and maintenance and repair material needed for public sanitation services (2-26-43).

"L" Orders:

L-42...Amendment relaxes restrictions on use of metals in plumbing fixtures (2-20-43).

L-49...Amended order clarifies order and exempts manufacturers of bed springs from provisions of the order (2-23-43).

L-97-a-1...Amendment requires producers to use surplus inventory stock in manufacture of freight cars where possible (2-23-43).

L-123...Amended order rules that certain purchases need not be accompanied by certificates showing they are exempted from restrictions of order (3-1-43).

L-157...Amended order further curtails number of hand tool products to be manufactured (2-24-43).

L-204...Amended order allows manufacture of special types of telephone sets designed for particular uses (2-26-43).

L-217...New schedules simplify production of concrete mixers, mixer agitators and certain pumps (2-25-43).

L-227...Amended order permits use of copper in pens (2-19-43).

L-236...Schedule No. 1 (2-25-43) reduces number of builder's finishing hardware which may be built.

L-266...Order places sterilizer equipment under strict control (2-24-43).

L-268...Order regulates sale and manufacture of oxyacetylene apparatus (2-24-43).

L-272...Order standardizes production of a number of industrial instruments (2-22-43).

Pricing Procedure for Secondary Iron and Steel Explained at Session

New York

• • • **One of the most** informative topics developed at a joint meeting of the OPA and the Steel Products Warehouse Association, here last week, a session called to discuss the new price schedule for resale of secondary iron and steel products, was the explanation of how to arrive at the base price for any city whether listed or not and how to apply the price for dislocated tonnage.

Appendix F of Amendment 12 to Revised Price Schedule 49 contains tables listing the base price for various secondary products at key basing points which coincide with the most active warehousing centers. (See lower right.) While these may be used as published, the question arose as to the means of determining the correct base price for an unlisted city.

For example, consider a shipment from New York City to Syracuse, N. Y., which is an unlisted basing point. Since the prices are delivered prices, it is necessary to determine the Syracuse base. This is done by considering each of the surrounding listed basing point cities, which in this case would be New York, Buffalo and possibly Cleveland and Pittsburgh. To the base price for each of these cities add the freight rate to Syracuse from each basing point. The lowest of the several resulting answers will become the base price for Syracuse. This method of figuring holds true in every case except where dislocated tonnage can be claimed. The base price for calculating used in every instance is the country price except where no country price exists.

When shipping within your own free delivery area, the local city base price prevails. If shipping out of this free area but less than 150 miles in any direction the country rate is charges plus freight. When making shipment to a nearby listed basing point city, such as from New York to Philadelphia, the delivered, or Philadelphia base is charged. If the listed city destination is beyond a 350 mile radius then either the destination base or the dislocated tonnage price can be charged depending on which is more satisfactory to the warehouse.

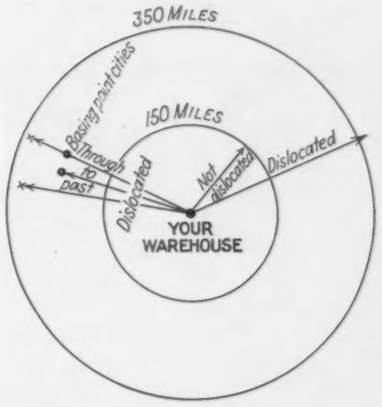
This brings about the necessity to clarify the terms of dislocated tonnage. (See chart top right.) If the center of the circle represents your warehouse location, the inner circle a 150-mile radius and the outer circle a 350-mile radius, dislocated tonnage may be claimed in the following instances:

Anywhere outside the 350-mile area is dislocated tonnage.

Any shipment within the 150-mile zone is NOT.

Any shipments to a basing point city, through a basing point city or past a basing point city in the 150 to 350-mile zone ARE considered dislocated tonnage.

Prices under dislocated tonnage claims are figured by using the country price for the seller's city plus freight, less 15c. per 100 lb. If no country price is listed for the seller's



city, the city price is used. As the material may also be priced at the destination city's base, the more advantageous of the two (destination base or dislocated tonnage) may be used. The dislocated tonnage price is made optional to permit the warehouse to ship at the price which will let him out for distant shipments.

o o o

Secondary Material Reduced 10 to 35%

New York

• • • **The Warehouse** Section of OPA and the Steel Products Warehouse Association jointly sponsored a meeting last Wednesday at the Hotel Pennsylvania for the purpose of announcing and explaining the new dollar prices established for resale of secondary steel products in Amendment 12 to Revised Price Schedule 49 which are effective March 1.

The effects of the order will be felt

TABLE I.—BASE PRICES FOR REJECTS
(Dollars per 100 pounds)

Cities [1]	Products								
	Hot rolled sheets	Cold rolled sheets	Galvanized sheets	Galvannealed sheets	Long terne sheets	Hot rolled strip	Cold rolled strip	Plate (both mill sheared and universal mill)	Black plate
Boston [2]	3.34	4.21	4.60	5.95	5.32	3.65	3.11	3.47	.....
New York [2]	3.22	4.14	4.50	5.85	5.22	3.56	3.25	3.58	4.05
Philadelphia [2]	3.20	4.17	4.41	5.63	5.40	3.56	3.16	3.20	.....
Baltimore (city)	3.15	4.50	4.55	5.45	.....	3.60	.....	3.33	.....
Baltimore (country)	3.05	4.50	4.45	5.45	.....	3.50	.....	3.23	.....
Washington, D. C.[2]	3.24	4.59	4.64	.....	.....	3.69	.....	3.42	.....
Norfolk, Virginia [2]	3.47	4.05	4.86	.....	.....	3.69	.....	3.65	.....
Buffalo (city)	2.93	3.87	4.28	5.49	5.13	3.44	3.17	3.26	.....
Buffalo (country)	2.83	3.77	4.18	5.49	5.03	3.44	3.17	3.26	.....
Pittsburgh (city)	3.02	3.60	4.28	5.09	4.82	3.24	2.88	3.06	3.74
Pittsburgh (country)	2.92	3.60	4.18	4.99	4.82	3.14	2.78	2.96	3.64
Cleveland (city)	3.02	3.65	4.16	5.99	4.80	3.15	2.88	3.06	.....
Cleveland (country)	2.92	3.55	4.06	5.99	4.70	3.15	2.78	2.96	.....
Detroit [2]	3.09	3.87	4.36	5.70	5.33	3.09	3.06	3.24	.....
Omaha (city)	3.47	4.29	4.97	6.32	5.51	3.78	3.66	3.74	.....
Omaha (country)	3.37	4.29	4.97	6.32	5.51	3.68	3.66	3.64	.....
Cincinnati [2]	3.08	3.93	4.43	5.97	5.09	3.30	3.11	3.29	.....
Chicago (city)	2.93	3.69	4.37	5.72	4.91	3.24	3.15	3.20	3.74
Chicago (country)	2.83	3.59	4.27	5.62	4.81	3.14	3.05	3.10	3.64
Milwaukee [2]	3.04	3.81	4.48	5.83	5.02	3.36	3.19	3.31	.....
St. Paul	3.15	3.92	4.50	5.94	5.49	3.47	.....	3.42	.....

[1] Prices are for the free delivery area of cities listed.
[2] City and country prices.

Super-Sterling

Flexible High Speed Hand Blades

METAL CUTTING BAND SAWS

Flexible Hand Blades

Made of high-speed steel, with hardened edge and taper-temper back, these efficient blades take the daily abuse of twisting and buckling without breakage and without danger of injury to face or hands from shattering. That's why mechanics who know, call Super-Sterling Flexibles the outstanding *safety blade. Guaranteed against breakage in normal use.*

Ask your Supply House about Super-Sterling *Flexibles*—and the complete line of Super-Sterling metal saws, or write Dept. A.

DIAMOND SAW WORKS, Inc.
BUFFALO, NEW YORK

LEE
Quality Springs
ALL SHAPES · ALL SIZES · ALL MATERIALS

LEE SPRING COMPANY, Inc.
30 MAIN STREET BROOKLYN, N.Y.

LEE-BUILT TRADE MARK SPRINGS

PRICES

in 10 to 35 per cent reductions in the prices of secondary material coming under the terms of the revision. This, however, does not include all secondary products, as a number already are covered specifically in other orders. Excepted products include used pipe, structural croppings resulting from fabricating shops and shipyards and second-hand material.

Basic purpose of the order, as described by Judson I. Cohen, OPA official, is to aid and encourage secondary warehouses by granting full consideration on justified price and at the same time to afford protection for the buyer.

The order eliminates the previous price ceilings which were based on prevailing prices as of April 16, 1941, and sets dollar prices with extras allowed on specific warehouse basing points. Dislocated tonnage price calculations were also allowed.

For a complete explanation of how to figure base prices at any point and how to apply dislocated tonnage prices on secondary products see the story appearing on page 151.

This action follows by a few days an OPA reduction in maximum prices for most steel castings, estimated to save the government $50,000,000 this year in the cost of ships, tanks, guns and planes.

The specific base prices which are set for the first time apply to flat rolled iron and steel products, including hot rolled, cold rolled, galvanized, galvannealed, and long terne sheets; hot and cold rolled strips; sheared and universal mill plates; and tin mill black plate. A much smaller volume of semi-finished secondary iron and steel products is covered by a precise pricing formula.

Prices are on a delivered basis and are given for each of the main warehousing centers in the United States. For sales to or within cities for which no base prices are given in the tables, the seller is to add freight from the city for which there is a base price that will result in the sum of the base price and the freight producing the lowest delivered price at destination.

Set at percentages varying between 65 and 90 per cent of prime quality prices, the maximum base prices are accompanied by schedules of permissible extras. Thus, while they are established in a similar manner to reductions effected in mill prices of secondary products on Sept. 17, 1942, through Amendment No. 7 to Revised Price Schedule No. 6 (Iron and Steel Products), they are modified to allow

for differing situations in the warehouse industry.

Delivered prices for semi-finished secondary products are established at 110 per cent of the mill prime price. They are bought by the warehouse at 85 per cent of the mill prime price. The addition is to compensate for warehouse handling, and approximates the gross profit in effect on April 16, 1941.

All other secondary iron or steel products for which prices are not established by the revision continue to be priced as before the amendment. However, the volume of these other secondary products is extremely small.

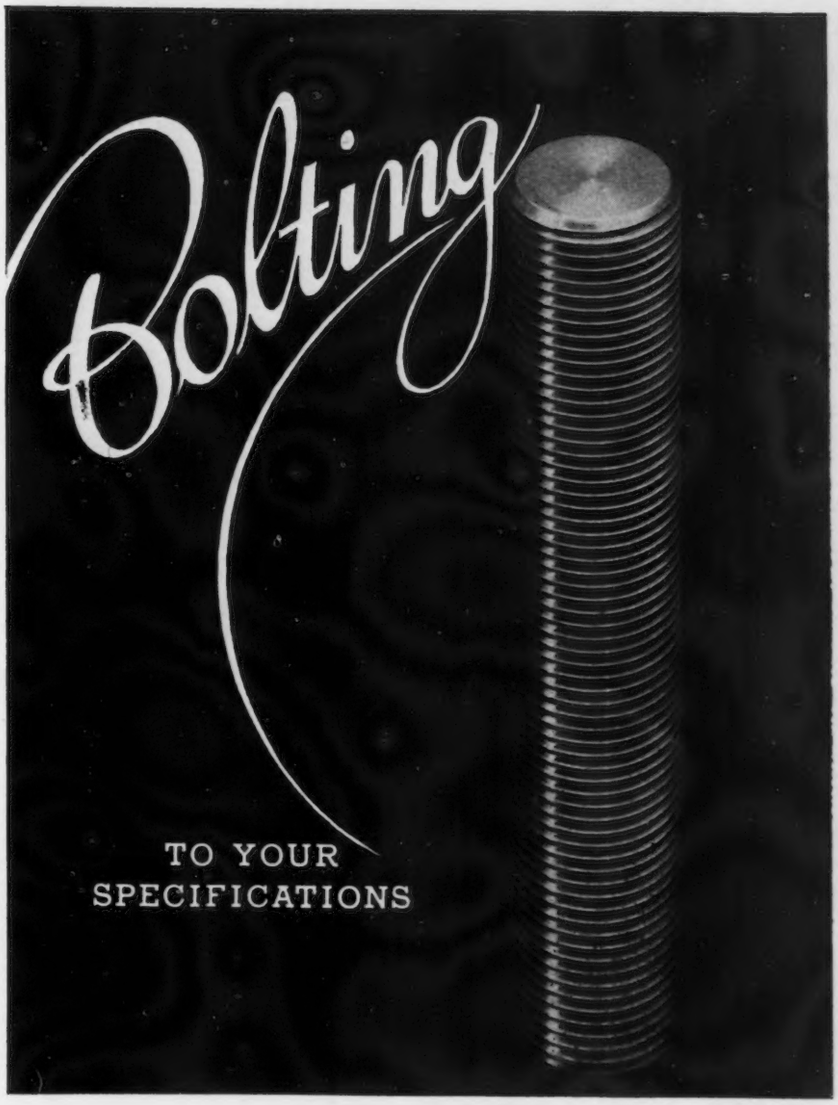
Other provisions of the amendment: No one may sell material at the warehouse prime quality price which he has bought at any grade lower than prime quality, or which has been invoiced to him at lower than prime quality by his supplier, regardless of any sorting, grading or other processing he has applied to it. However, the seller may sort, size, gauge or otherwise process wasters and waste wasters to bring them up to the standard or definition of rejects, and wasters and charge accordingly. The later processing, OPA said, is a normal warehousing function that increases the value and utility of the material.

Although the only extras that ordinarily may be added to the base prices for unsheared and sheared products are specified, OPA may approve upon application specific extras and charges that were in effect and charged by the seller on April 16, 1941.

The quantity charge or deduction is made uniform for all products other than cold rolled strip, and approximates that in effect for prime quality products in the different areas. On cold rolled strip, which is of a comparatively special nature and is sold generally in relatively small quantities, the quantity charge or deduction is that used by the steel mills. The two sets of quantity charges and deductions are applicable to all sales in all localities.

Increased costs of pickling at warehouses or for job pickling over costs at the mill, are recognized through differentials of 25c. and 20c. per 100 lb. for sheets and plates respectively, in addition to the charge for mill pickling. However, when the sheets and plates are pickled at the mill, only the mill pickling charge may be made.

When a shipment contains two or more products or grades of products, or both, and the exact amount of each



Our Boss Is Your Boss . . .

Today we are both working directly or indirectly for Uncle Sam—so we understand how important it is to concentrate on first things first. Regulations and restrictions set up by our government point the course we all follow. It means many times that personal service that has been so vital a part of our business life and all business life, must give way, temporarily.

The new things we are learning about specialized bolting, coupled with our old time idea on service, will profit our peace time customers when business gets back to normal again.

ERIE BOLT & NUT CO.
ERIE, PA., U.S.A.

forgings by **STANDARD**

During the many yesterdays that have passed into memory since 1795, Standard products played their part well . . . gained their reputation for dependable quality.

In the history making present of American industry and transportation, Standard forgings and castings are handling an even greater role with the advantage of long, sound preparation for the task.

And, as the curtain rises on the still unwritten act of the future, Standard will be prepared to apply past knowledge and present findings to the practical solution of new problems with which users of steel forgings and castings may be confronted.

STANDARD STEEL WORKS

DIVISION OF THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA

FORGINGS • CASTINGS • WELDLESS RINGS • STEEL WHEELS

cannot be specified by the seller, he must use the base price for the lowest priced product or the quality extra for the lowest grade or both for the entire shipment.

The amendment requires filing a report of the inventory of secondary or rejected iron or steel products covered by the revision on hand on March 1, 1943. The inventory is to be reported showing separately the total tonnages of prime and of secondary or rejected quality products and is to be forwarded in duplicate to OPA's Iron & Steel Price Branch in Washington, on or before April 1, 1943. The report need not be made by any seller who had no inventory of secondary products on hand on March 1, 1943.

The meeting was presided over by E. L. Wyman, chief of the Warehouse Section, OPA; C. M. Ballou, president of the Steel Products Warehouse Association; Judson I. Cohen and Herbert Blantz of OPA.

•

Used Tool Prices To Be Slashed and Rebuilders Aided

New York

• • • **Used machine tool** dealers on the Eastern Seaboard were excited last week over plans to cut resale prices by as much as 25 to 60 per cent according to plans being reviewed by OPA. Used machine dealers and members of the Machine Dealers National Association meeting with OPA members in New York last week worked long and hard to come to agreeable terms with OPA whereby alterations of prices would be equitable throughout and not harmful to the dealer.

It was admitted during the session that some prices on some machines were too high but emphasis was placed on the point that in making a broad and sweeping alteration that care should be taken not to create more inequities than were now present.

The OPA's efforts were directed toward bringing about a suitable compromise which would not only reduce the price to the buyer but also broaden the margin for the rebuilder. The suggested method of handling the price structure was through tne operation of an equivalent value table drawn up to give specific sizes, types and ages of machines a definite percentage value of new machines with provisions made for pricing obsolete

OLIVER NUTS

OLIVER NUTS

Oliver's special forming process used in the manufacture of nuts improves the appearance of the product, assures easy threading-on, a tight grip, accurate wrench-fit. Made from various steels, alloys or non-ferrous metals — heat-treated, galvanized or plated.

OLIVER
IRON AND STEEL
Corporation
PITTSBURGH, PENNSYLVANIA
BOLTS . . . NUTS . . . RIVETS
STEEL FASTENERS

types having no new value comparison.

Herbert Segal, chairman of the local chapter of the Machine Dealers National Association, said "Under the new system machinery no longer being made will be tied up with specific late models and makes for purposes of comparison. At the same time reductions will be made in some cases by permitting only a part of the list prices of new machinery to be used for pricing old types."

To explain how the method will work Mr. Segal cited the following example:

"At present an old planer of a certain type, made, say, before 1920, is usually priced by comparing it with one of equal size on the basis of the cost of the Cincinnati planer as of March 1, 1941. Besides tying old planers of this type definitely to the Cincinnati model, the OPA will make price comparisons with one-half of the list price of the latter, thus reducing prices on these used planers 50 per cent."

Reductions are expected also in the percentages of new prices that may be charged based on time of manufacture.

Where prices would still be out of line even after these cuts, the OPA will establish arbitrary prices against which percentages based on date of manufacture would be applied.

Also where there is no similar make or model because of rapid advances in engineering, the OPA will establish dollars-and-cents figures.

Mr. Segal said it was expected that the greatest cuts would be made in setting up the table of equivalent values, rather than in age percentages.

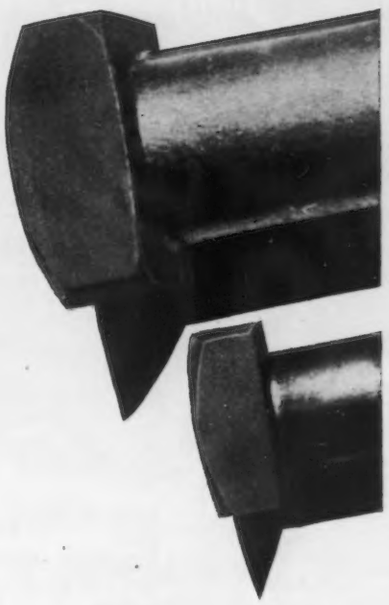
Price Relief Will Encourage Output of Alloy Pig Iron

Washington

• • • **OPA in Amendment No. 5** to RPS No. 10 issued Feb. 26 to be effective March 3, permits additions to base prices of pig iron for various ranges of nickel content. This move was made to encourage the salvaging of high alloy scrap for further use in war weapons. The action is also believed to have been precipitated by the large quantities of high nickel turnings being pushed into the market by munitions manufacturers machining high alloy grades of steel.

The price allowance was made to equalize the selling price of alloy pig iron against the additional cost of al-

OLIVER BOLTS



OLIVER BOLTS

Hundreds of sizes and types of standard and special bolts, studs and cap screws are made by Oliver. Carbon steels, alloy steels, non-ferrous metals — heat-treated, galvanized or plated according to your needs. Cut or rolled threads, accurate shanks and heads.

OLIVER
IRON AND STEEL
Corporation
PITTSBURGH, PENNSYLVANIA
BOLTS . . . NUTS . . . RIVETS
STEEL FASTENERS

loy scrap which carries a price differential under the terms of RPS No. 4.

As set forth in the amendment additions to base prices per ton are specified exactly for the first several percentages. Thus a differential of $2 is allowed for nickel content from 0.5 per cent to 0.74 per cent inclusive; $3 for 0.75 to 0.99 per cent; $4 for 1.00 to 1.24 per cent; and so on, with $1 additional premium for each 0.25 per cent increase.

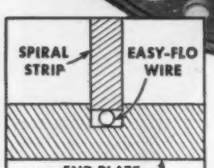
Todd Goes to England For WPB Steel Division

Washington

• • • **William B. Todd**, former Jones & Laughlin Steel Corp. executive, has been appointed assistant director of the WPB Steel Division it was learned on Tuesday. Mr. Todd has been sent to England to serve as the steel man on the Harriman Mission. He will act in liaison capacity between the United Kingdom and the United States.

Change to EASY-FLO brazed construction *jumped production over 500%*

on this war job



Assemblies are prepared with 1/32" dia. EASY-FLO wire preplaced in a groove. Spiral strip is weighted on top to force it down when EASY-FLO melts. Assemblies are brazed in a gas furnace. Preplacing the alloy helps speed production and gives control of amount of alloy used.

THE JOB—Producing aircraft machine gun magazine end plates.

FORMER METHOD—Plates were machined from heavy forgings. Production rate was 32 minutes per plate.

NOW—Spiral strips are EASY-FLO brazed to steel stampings as shown in the illustrations.

RESULTS—EASY-FLO brazed construction changed this job from a bottleneck to the fastest operation on the line. It reduced time per plate to 5 minutes, a production jump of over 500%—saved thousands of lbs. of steel and hundreds of man-hours—freed machines for other work—cut costs to such an extent that substantially lower bids were made on subsequent contracts. In a part going into planes, the weight reduction was particularly advantageous.

EASY-FLO IS THE KEY

Equally gratifying results have been obtained on many other war jobs redesigned for EASY-FLO brazed construction—a construction made practical because this low-temperature silver alloy makes joints as strong as solid metal—and makes them fast and reliably because it is so free-flowing, fast-acting.

IT IS EASY TO CHANGE TO EASY-FLO BRAZED CONSTRUCTION

This fact plus the benefits in time, metal saved and savings in cost, justifies a change from machined parts to EASY-FLO brazed construction wherever possible. We'll be glad to cooperate in checking your designs for opportunities.

ARMY E NAVY

FOR DETAILS ABOUT EASY-FLO

speed, reliability and economy on both ferrous and non-ferrous metal joining, write today for Bulletin No. 12.

HANDY & HARMAN 82 FULTON ST., NEW YORK

Agents in Principal Cities. In Canada: HANDY & HARMAN of Canada, Ltd., Toronto

CIO-USW Named Agent For 13 Lake Ore Producers

• • • **CIO's USW was named** as the exclusive bargaining agent for the production and maintenance employees and time-and-a-half was granted in a contract covering approximately 20,000 employees of 13 iron ore companies owning more than 90 mines in the Lake Superior region. It includes a seniority clause, grievance machinery for settling disputes and other provisions.

In announcing the contract last Saturday, the National War Labor Board said the companies involved are Pickands Mather & Co., Cleveland Cliffs Iron Co., M. A. Hanna Co., Evergreen Mining Co., Snyder Mining Co., Pittsburgh Coke & Iron Co., Oglebay Norton & Co., International Harvester Co., Wheeling Steel Corp., Interstate Iron Co. (Jones & Laughlin Steel Corp.), Inland Steel Co., Republic Steel Corp and North Range Mining Co. Most of the companies have several mines.

The contract, at present, does not include wage rates or a union security clause. These two issues are before another mediation panel of the NWLB.

Zinc Supply Balanced Wilcox Tells Association

Pittsburgh

• • • **There is an approximate** balance between zinc supplies and demand for the last three quarters of the year, R. L. Wilcox, WPB Conservation Division zinc consultant, told the American Hot Dip Galvanizers Association here last week. He further said that as far as the galvanizing industry is concerned it would be in a position to handle about the same amount of business as is now the case. No significant increases can be expected.

Mr. Wilcox told Association members that there is no need at present to eliminate the use of low-grade zinc as long as the end product is essential to the war effort.

Officers of the Association, who were re-elected at the technical meeting, are: President, Phelps Ingersoll, Wilcox, Crittenden & Co., Inc., Middletown, Conn.; first vice-president, Clem Stein, National Stacey Corp., Columbus, Ohio; second vice-president, J. B. Tate, Witt Cornice Co.; secretary and treasurer, Stuart J. Swensson, and technical director of research, Wallace G. Imhoff.

Engineer Corps Supervises Large Expansion Program

• • • **The War Department** announced Feb. 26:

Authorization for expansion of existing facilities at an Army Air Forces installation in Dickinson County, Kansas, to cost approximately $2,000,000. Construction is to be supervised by the Kansas City district office of the Corps of Engineers.

Authorization for expansion of existing facilities at an Army Air Forces installation in Pratt County, Kansas, to cost approximately $2,000,000. Construction will be supervised by the Kansas City district office of the Corps of Engineers.

Authorization for construction of a station hospital in connection with an Army installation in Smith County, Texas, to cost approximately $1,000,000. Construction is to be supervised by the Denison, Texas, district office of the Corps of Engineers.

Acquisition by lease of the Dante Hospital and the Polk-Pacific Garage property in San Francisco, Cal., for conversion into an Army station hospital. Work involved in this conversion is under the jurisdiction of the San Francisco district office of the Corps of Engineers.

Acquisition of a leasehold interest in the Oakland Hotel, Oakland, Cal., for conversion into an Army station hospital. Work involved in this conversion is under the jurisdiction of the San Francisco district office of the Corps of Engineers.

Authorization for expansion of existing facilities at an Army Air Forces installation in Red Willow County, Neb., to cost approximately $2,000,000. Construction incident to this project is being supervised by the Omaha district office of the Corps of Engineers.

Authorization for expansion of existing facilities at an Army Air Forces installation in Hall County, Neb., to cost approximately $2,000,000. Construction will be supervised by the Omaha district office of the Corps of Engineers.

GOOD NEIGHBOR: Costa Rica's versatile Carmen Venegas who at 14 drove an electric locomotive, is contributing to the Allied cause as an application engineer in the Government Department of the Westinghouse Electric International Co. Her duties include handling technical engineering problems that arise in supplying motors, generators and other power apparatus to America's allies.

Wide World

WPB Denies End Of Production Directives

Washington

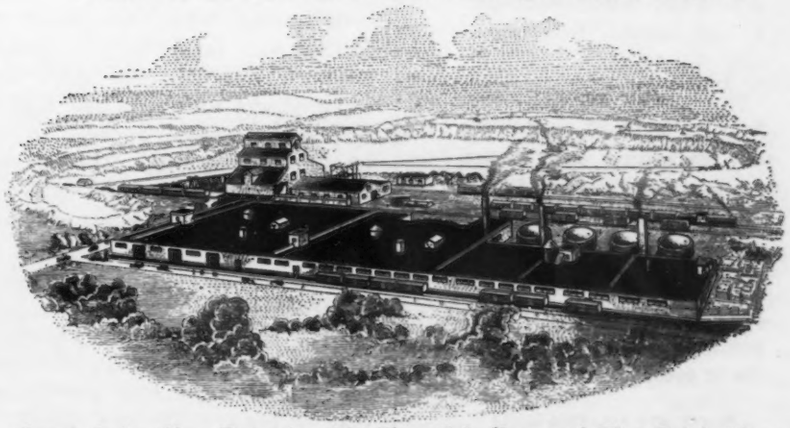
• • • **Responsible officials** of the WPB Steel Division on Tuesday denied that it would be possible to eliminate production directives and break fabricating bottlenecks by detailed mill scheduling. The possibility of this move was reported in THE IRON AGE of Feb. 25 on page 101. Officials asserted that the abandonment of production directives would work untold confusion. They pointed out that mills would again have unbalanced schedules and very likely produce more profitable lines at expense of other lines needed in the war effort. It was explained that present production directives are designed to obtain the correct product rolling at the right places and transportation difficulties might arise from unbalanced mill loads.

GOOSE LAKE

Fire Clay and Fire Clay Flour

Fire Clay Brick

Therm-O-Flake Insulation



Goose Lake Clay Deposit with Clay Grinding and Fire Brick Plant

Illinois Clay Products Company

JOLIET, ILL.

Hammond
OF KALAMAZOO
AUTOMATIC FINISHING MACHINES

For Burring, Brushing and Polishing of

PLATED OR BASE METALS

These Hammond High-Production 6 and 8 spindle table automatics are in use now—"helping to win the battle of production." If you have a problem in burring, brushing or polishing on plane parts, tank parts, bomb parts, shells, etc., send us samples—some in the rough — one acceptable finished piece for complete engineering report. Do it today.

WRITE FOR BULLETIN GP-17

ALSO: Grinders; Abrasive Belt Surfacers; Polishing Lathes and Cylindrical Finishing Machines

Hammond Machinery Builders INC
★★★ 1612 DOUGLAS AVENUE ★★★
KALAMAZOO • MICHIGAN
Eastern Branch—71 West 23rd Street, New York, N. Y.

Canned Goods Lack Not Seen Result of Tinplate, Lend-Lease

• • • Under the rationing program begun last Monday, civilians will get about 50 per cent of the quantity of canned goods they normally buy. Lend-Lease shipments appear to be the favorite reason, with Army and Navy requirements, hoarding, increased civilian purchasing power, lack of food, lack of tin plate and government stockpiling also ring in.

In 1941, very close to 2,500,000 tons of tin plate went into food containers. Last year, about 1,900,000 tons were used to make containers. A container allocation figure for all of 1943 has not yet been set, but figures for the first two quarters indicate, say Department of Agriculture, WPB Office of Civilian Supply and can manufacturing sources, that the quantity of food packaging metal used will be close to that of last year. Unlimited canning metal has been ordered for all principal crops for 1943.

Actually Lend-Lease requirements are small. Last year, Lend-Lease shipments of canned vegetables amounted to 1.7 per cent of the total U. S. supply; canned fruits and fruit juices came to 0.8 per cent. This year the shipments will be increased, possibly to as much as 3 per cent, probably to a figure close to 2 per cent. Lend-Lease canned and frozen fish shipments were larger, coming to 7.1 per cent.

Of meat products, 5 per cent of the supply was taken by Lend-Lease, most of it pork. The 1 per cent of beef exported was more than paid back in reverse Lend-Lease of beef to our troops in Australia. The biggest chunk of food to go via Lend-Lease this year will be dried beans and peas, with shipments coming to 30 or 40 per cent of production. Last year they were 5 per cent.

Much of the greatest amount of total tin plate production in 1942 went for containers, varying from more than 80 per cent in some months to slightly over 50 per cent in others. Most of the remainder went to the Army, the Navy and for export. Export took about 11 per cent of the total with Lend-Lease accounting for about half of this. Most Lend-Lease tin plate went to Australia, with lesser amounts to Russia, South Africa and India.

Definitely SUPERIOR!

HOT *and* COLD ROLLED STRIP STEEL *in* CARBON *and* ALLOY ANALYSES *including* STAINLESS

SUPERIOR STEEL CORPORATION
CARNEGIE
PENNSYLVANIA

CMP Amends Scheduling Procedure To Assure Production and Delivery

Washington

• • • **CMP Regulations No. 1, 3** and 4 underwent changes on Monday designed to establish procedures for contingencies not heretofore covered by the orders and to assure scheduling of production and delivery of most important items first as required under the new flow-of-production-and-material thinking now prevalent in Washington.

Of most interest to manufacturers is the revision of paragraph (p) of CMP Regulation No. 1, which now sets forth in detail the conditions in which delivery orders for Class A and B or other products must be refused.

Effective at once, no manufacturer may accept an allotment for the manufacture of a Class A product, regardless of the accompanying preference rating, if he does not expect to be able to fulfill the related authorized production schedule. Additionally, if he has accepted an allotment and an authorized production schedule for a Class A product, he may not accept any other delivery order, except one rated AAA, if its filling would interfere with the completion of the previously accepted schedule.

A **manufacturer** turning out Class B products to fill unrated or low-rated orders must accept higher rated orders, as provided in Priorities Regulation No. 1, unless he is also making a Class A product on an authorized production schedule. In the latter case, he will be guided by the provisions of the paragraph above.

The other change in CMP Regulation No. 1 gives effect to the recently announced discontinuance of Form CMP-6. That form was originally prescribed for use in placing authorized controlled material orders with a producer of controlled materials. In place of CMP-6, the regulation now provides a form of certification which may be placed on the purchase order. This will result in substantial savings of paper work on the part of those operating under CMP. (See story on page 146.)

CMP Regulation No. 3 is amended to permit such persons as dealers, distributors and jobbers, who receive rated orders from their customers bearing allotment numbers or symbols, to use the allotment number or symbol in extending the rating. Previously they were allowed to extend only the preference ratings without allotment numbers. However, allotment numbers used in connection with the extension of preferred ratings do not constitute an allotment and therefore may not be used to obtain controlled materials.

Production material, as redefined in the new version of Regulation No. 3, now includes items purchased by a manufacturer for resale to round out his line, if these items do not amount to more than ten per cent of his total sales.

This regulation also now permits a manufacturer who has received a rating with an authorized production schedule to apply to deliveries to be made to him during the second quarter of this year any rating previously received which he is authorized to use, despite the provisions of Priorities Regulation No. 12 regarding the compulsory extension of downward re-ratings. In authorizing production schedules for secondary consumers of controlled materials to whom he has already extended a rating previously received by him, such a manufacturer may extend the appropriate allotment number for use with the earlier rating. This provision will prevent to a large degree disturbances to existing production schedules which might otherwise occur.

Changes in CMP Regulation No. 4 clarify the conditions in which a distributor may fill orders, other than authorized controlled materials orders, for specified quantities of steel shapes and forms.

o o o

WPB on 48-Hr. Week To Screen PD Forms

Cleveland

• • • **With regard** to the decentralization policy of WPB, which will place the screening and processing of all PD-1-a applications for capital equipment in the hands of the 12 regional WPB offices, it is estimated here that this will relieve Washington of handling 83 per cent of all PD-1-a applications, which are currently running around 35,000 per week. For the fifth region, with headquarters in Cleveland, an estimated 3000 a week will be reecived, and some 2500 will be handled locally.

In regard to the PD-200 applications for construction involving expenditures of $10,000 or less, it is expected that the region will handle approximately 200 a week on the basis of incoming applications at the current rate. In addition to screening for correct filing procedure and other mechanics and for essentiality of the project, the regional offices will also direct the stripping down of these applications where necessary because of scarcities of critical building materials. Also, the district offices will be charged with the responsibility of substituting used or secondary equipment and materials for both PD-1-a and PD-200 applicants where such can be done.

The Regional Emergency Materials Plan, a plan whereby each region was allocated specified amounts of critical materials for emergency breakdowns, etc., will be broadened to fit it into the set-up of handling PD-1-a applications to avert any emergencies. Where material or equipment cannot be obtained from the Redistribution Division, Steel Recovery Corp., or other similar organizations, it is drawn from the stocks under the REM Plan.

Next to be considered for decentralization will probably be appeals for relief under restrictive orders and form PD-1-x, applications of jobbers, wholesalers and retailers to replenish stocks of materials. This latter form covers a great number of items, and before it will be set up for regional handling, the present program will be examined completely.

In filing PD-1-a forms, it was discovered that the greatest mistake made by applicants was the failure to sign the form. Some 16 per cent of all PD-1-a applications sent to Washington had to be returned for signatures. Applications without addresses were also quite prevalent.

A 48-hr. schedule has been set by the Cleveland regional office for handling the PD-1-a and PD-200 forms; that is, no more than 48 hr. will elapse from the time it is received in the district office until it is returned to the applicant with either approval or denial. Emergency cases, it is believed, can be handled in 12 hr. or less.

PERSONALS

• **Jack Levand,** formerly secretary-treasurer of the Simon-Levand Co., Cleveland, scrap brokers, has been appointed Ohio district manager for Luria Bros. & Co., Inc., Philadelphia. Mr. Levand is also vice-president of the Northern Ohio chapter of the Institute of Scrap Iron & Steeel, Inc., and a member of the executive committee of the Cuyahoga County Scrap committee.

• **Albert D. Wilson** has been elected chairman of the board and **Roger E. Gay** has been elected president of the Bristol Brass Corp., Bristol, Conn. Mr. Wilson has been president of Bristol Brass for the past seven years, and treasurer for many years before that. The new president of brass corporation became associated with American Brass Co., Waterbury, Conn., in 1926. In May of 1938 he went to Bristol as assistant to Mr. Wilson, and later became first vice-president.

• **Harry S. Wheller** has been elected president and general manager of L. J. Wing Mfg. Co., New York. Mr. Wheller, who has been vice-president since 1917, succeeds the late Alfred E. Seelig as head of the company. Other officers elected were **Walter W. Wilson,** who has been with the company over 30 years, as vice-president and treasurer, and **Charles H. Smith,** who has been with the company for 20 years, as secretary.

• **Albert S. Redway,** formerly vice-president of Farrel-Birmingham Co., Inc., Ansonia, Conn., has been named vice-president of the Geometric Tool Co., New Haven, to assist **James W. Sneyd,** the company's executive vice-president.

• **L. G. Bean,** vice-president and general sales manager since 1939, has been appointed vice-president in charge of engineering and sales of the Bristol Co., Waterbury, Conn.

• **Harry E. Beane** has been named sales manager of the Bristol Co. He joined the Bristol sales engineering organization in 1920 and in 1936 was promoted to field sales manager to supervise the activities of the company's branch factories at Chicago, Akron, and San Francisco and to supervise the work of company's district managers, sales engineers, and service engineers.

• **E. L. Stilson** has been appointed assistant sales manager, the Bristol Co., with headquarters at the general offices, Waterbury, Conn. He joined the Bristol sales organization in 1920 and since 1940 has been associated with the field engineering department.

• **Bruce L. Simpson** has been elected president of the National Engineering Co., Chicago. He succeeds his father, **Herbert S. Simpson,** who becomes chairman of the board.

SORRY, Mr. Benjamin F. Harris, we ran the wrong picture in announcing your resignation as president of National Tube Co., Oil Well Supply Co. and Tubular Alloy Steel Corp. in the Feb. 18 issue.

• **I. L. Jennings,** vice-president of the Lamson & Sessions Co., Cleveland, since 1941 has retired from active business for reasons of health. Mr. Jennings began working for the Lamson & Sessions Co. in 1907 and worked through various departments of the bolt plant for six years. From 1913 to 1919 he was a salesman on the road. In 1919 he was made assistant sales manager and was made sales manager in 1920. Mr. Jennings became successively assistant secretary, secretary, factory manager in charge of operations, and vice-president in charge of sales in 1926. Mr. Jennings became vice-president and treasurer in 1933, and has been vice-president since 1941. Mr. Jennings will remain as a director and substantial stockholder in Lamson & Sessions.

• **D. A. Shardelow,** in the Dayton sales office since 1936 has been appointed district sales manager at Indianapolis for Republic Steel Corp., Cleveland.

• **Wilfred C. Shattuck** has been made wire sales manager of the Wickwire Spencer Steel Co., New York. Mr. Shattuck returns to Wickwire with whom he was connected until 1940 after two years with John A. Roebling's Sons Co.

• **Ernest N. Taylor** has been advanced to the position of acting manager of the Western Region of the Detroit Rex Products Co. His headquarters are in the Chicago office, 1166 West Cermak Road. **George Pew** has been promoted from resident engineer in the eastern region office at New York to manager of the quotation department at the company's Detroit headquarters.

• **B. R. Sherrell** has been named general manager of the aircraft division of Willys-Overland Motors, Inc. Previously he was production manager of the national division of Vultee Aircraft Corp. and works manager of the company's plant in Nashville, Tenn.

• **Cliff Schwenn** has been named general superintendent of the foundry of the Brillion Iron Works, Inc., Brillion, Wis. Mr. Schwenn has been with the Caterpillar Company, Peoria, Ill., for the past 14 years in a similar capacity.

• **Lincoln R. Scafe,** vice-president and general manager of the Glenn L. Martin-Nebraska Co., will return to the Glenn L. Martin Co. at Baltimore and **G. Tom Willey,** former inspection manager at Baltimore, will succeed him.

• **Wilfred Sykes,** president of the Inland Steel Co., has received the honorary degree of doctor of engineering from the Illinois Institute of Technology at its 1943 commencement held in Orchestra Hall, Chicago.

• **B. L. Metzger,** formerly technical supervisor of Willys-Overland Co.'s ordnance plant in Toledo, has been appointed manager of the Allied Screw Machine Co., Inc., Chicago.

• **J. K. Johnson,** senior engineer of Hazeltine Electronics Corp., Chicago, has resigned to become special representative of WPB in the office of the Under-Secretary of the Navy.

• **W. R. Hamilton** has been appointed plant manager of Northern Aircraft Products, Aviation Corp., at Toledo, and **A. C. Moore** has become plant manager of Republic Aircraft Prod-

ucts, at Detroit. Mr. Hamilton, who has been Plant Manager of Republic Aircraft Products at Detroit, will direct final tooling and initiate large-scale production at the new Northern Aircraft Products plant at Toledo. Mr. Moore, who replaces Mr. Hamilton at Republic Aircraft Products, was production manager at American Propeller Corp., at Toledo, subsidiary of the Aviation Corp., during the past year.

• **J. A. Ireland,** division sales manager, has been made assistant general manager of sales of the Steel & Tubes Division of Republic Steel Corp.

• **Charles E. Robinson** has been appointed general sales manager, Sommerfeld Machine Co., Braddock, (Pittsburgh), Pa. In addition to his duties as general sales manager, Mr. Robinson will continue as assistant to the president. He succeeds **J. W. Hemmerle,** who for some time has been sales agent for Sommerfeld boring and turning lathes.

• **J. P. Enright** has been appointed abrasive engineer for Indianapolis and vicinity by Norton Co., Worcester, Mass. **Robert W. Crawford** has been appointed a Norton abrasive engineer in the Pittsburgh territory taking the place of **William A. Russell** who is now an ensign in the U. S. Navy.

• **Edwin S. Armstrong** has joined the W. W. Sly Mfg. Co., Cleveland, as manager for the Milwaukee district, including the greater part of the state of Wisconsin. His headquarters are at 7936 Rogers Avenue, Wauwatosa, suburb of Milwaukee.

• **N. R. Mehler** has been appointed as manager of cold rolled strip sales, Sharon Steel Co., Sharon, Pa. Mr. Mehler will continue as manager of coated products sales. **E. A. Heutsche** has been named as assistant manager of cold rolled strip and coated products sales.

• **Ray Gourley,** field manager, has been appointed sales manager of the Ferbert-Schorndorfer Co.

• **Herman Rohde** has resigned as manager of the convector radiator enclosure department of Ferro-Co Corp., Brooklyn. Mr. Rohde has purchased a cold-storage business which he will operate.

• **James A. Davis,** former metallurgist with the Colorado Fuel & Iron Corp., Pueblo, Colo., has been appointed to the technical staff of Battelle Memorial Institute, Columbus, Ohio, where he has been assigned to metallurgical research related to the war effort.

OBITUARY...

• **George A. T. Long,** head of the foundry service department of Pickands Mather & Co., Chicago, for the past 40 years, died suddenly on Feb. 15 at his home in Chicago. He was 85 years old. Mr. Long has been recognized as an outstanding authority on foundry problems and has been active in the American Foundrymen's Association since its organization.

• **James Griswold Blunt,** assistant to James E. Davenport, vice-president in charge of engineering of the American Locomotive Co., died in Schenectady, on Feb. 15. He was 74 years old.

• **Stanton S. Hertz,** a vice-president of the Copperweld Steel Co., and his 13-year-old daughter, Alice, died from suffocation when fire damaged their home at Pittsburgh, Sunday, Feb. 21.

Hertz was with Westinghouse Elec. & Mfg. Co. before the last war, and has been with the Copperweld for the past 25 years, serving first as chief engineer, later as New York district manager and was loaned by the company to the Copper Wire Engineering Association for a time.

• **Mason Hulett,** of Farrel-Birmingham Co., Inc., Ansonia, Conn., and Buffalo, N. Y., died suddenly, Feb. 7, in Washington. Mr. Hulett had been connected with the New York office of Farrel-Birmingham for the past nine years as sales engineer and consultant on gears.

• **Roy D. Baldwin,** advertising manager and a director of the Simonds Saw & Steel Co., Fitchburg, Mass., died Feb. 18. A native of Omaha, he joined the Chicago office of the concern in June, 1904, and three years later was transferred to Fitchburg as advertising manager. He was 62 years old.

• **Herbert B. Crile,** who represented the Superior Sheet Steel Co. in Ohio, Indiana and Michigan, until his retirement five years ago, died Feb. 18, at his home in Canton, Ohio, after a long illness.

• **Carl E. Lingenfelter,** manager, machinery sales division, United States Steel Supply Co., died Feb. 11. Mr. Lingenfelter was 67 years old and has been associated with the United States Steel Supply Co., formerly the Scully Steel Products Co., continuously since Feb. 1, 1903.

• **William E. Bee,** chairman of the Palmer-Bee Co., Detroit manufacturer of power transmission and material handling equipment, died Feb. 9. Mr. Bee and two associates founded the Palmer-Bee Co. in 1905.

• **Henry E. Olsen,** founder of the Milwaukee Gear Co., Milwaukee, died Feb. 7 aged 74 years. He opened his first gear manufacturing plant in Racine, Wis., shortly after arriving in this country from Norway in 1915.

• **Stanley Kitto,** treasurer of the Belle City Malleable Iron Co., Racine, Wis., died suddenly from a heart attack. He was 48 years old and joined the Belle City firm in 1916.

• **Edward J. De Guenther,** president and general manager of the Edde Mfg. Co., Milwaukee, died Feb. 9 in Chicago after a long illness.

• **Earl F. Hauserman,** president of E. F. Hauserman Co., Cleveland, died Feb. 8. He was 58 years old.

• **Mason Hulett** died suddenly Feb. 7, in Washington, D. C. Mr. Hulett had been in Washington for the past several weeks as chief, Industrial Gear and Speed Reducer Unit, Material Handling Equipment Branch, WPB. Mr. Hulett had been quite a number of years with the Falk Corp., and in more recent times with the Farrel-Birmingham Co. in its New York office.

• **Lawrence Gotfredson,** retired truck manufacturer, died at his home in Detroit, Feb. 13. Mr. Gotfredson founded the American Auto Trimming Co. which operated in Detroit, Cleveland and Walkerville, Ont., and the Gotfredson Truck Co. at Detroit.

• **John McDonald Hothersall,** formerly associated with the American Can Co., New York, and a well-known inventor, died Feb. 3, aged 67 years.

• **Raymond G. Ellis** of the Advertising Department, the Electric Storage Battery Co., Philadelphia, died Feb. 14th. He had been convalescing from an operation, when seized with an unexpected heart attack.

• **Thomas W. Larkin,** president of the LeRoy Plow Co., died Feb. 7, aged 82 years. He had been a farm implement manufacturer for 53 years.

• **DeWitt C. Morrow,** resident salesman for the Carnegie-Illinois Steel Corp., died Feb. 8. He was 63.

MACHINE TOOLS

. . . Sales, Inquiries and Market News

Warner & Swasey Co. Shipments Hit New High

• • • **Turret lathe shipments** of the the Warner & Swasey Co., Cleveland machine tool manufacturers, for January and February were 8 per cent above the total for November and December and the highest for any two months in the company's history, it was announced by Charles J. Stillwell, president of the company.

Mr. Stillwell reported that the company's backlog of unfilled orders represents six months' output, working seven days a week, 24 hours a day, and is larger than it was on the first of March, 1942.

"The demand for turret lathes for war will unquestionably remain at a very high level throughout the year," Stillwell said. "While it seems probable at this writing that the demand will slacken toward the close of the year, shipments for the year as a whole may come surprisingly close to the 1942 total.

"Meanwhile, anticipating a possible decline in orders toward the end of the year, the company is considering bringing into the plant at that time a type of war work requiring extreme accuracy. In fact, the company is now discussing with certain aircraft and diesel engine manufacturers the possibility of producing certain parts for them later in the year."

•

Women Prove Satisfactory In Western Machine Shops

Cincinnati

• • • **Employment** of women in the actual production of machine tools in this area can be said to have passed the mere experimental stage. Several large manufacturers in the area have had merely substantial forces of females in their factories for quite some time and the reports indicate that they are doing the work in a very creditable fashion. As a matter of fact, several employers have indicated that the work of women in their plants was up to a standard as high as that of men. One large manufacturer of lathes as an assembly line completely manned by women doing very heavy work and reports indicate satisfactory results. Another manufacturer with 200 or more women in the factory has them operating cranes, casting equipment and other machines, and he indicates satisfaction with their work and the production. A goodly number of the local plants, however, are still resisting use of women on the general machine shop work, although a number of these have women in tool rooms, stock rooms and doing what has formerly been considered light work in the plants. Those who have employed no women indicate, however, that there is still a modest flow of usable masculine labor coming into the market, but, of course, this type of labor requires training. One or two small plants have set up cooperative systems with vocational high schools and have been putting on youngsters of high school age. While, of course, the supply is not very large, plants engaged in the system indicate that the results have been satisfactory and the boys, upon graduation developed into reasonably valuable workers.

585 Miles of Prints Required for Bomber

• • • How the airplane industry ever assembles large quantities of bombers is always a source of wonder when the intricacies of these ships are examined. The cut-away bomber on exhibit in the Chrysler Building, New York, for example, is evoking astonishment from the public daily.

An insight into the engineering behind the modern ships is provided by the Glenn L. Martin Co., which points out that for one model alone (the B-26 medium bomber), 19,036 drawings had been made by the end of 1942. If the blueprints were all 1-ft. wide and placed end to end, they would stretch out for 585 miles and the weight would be 51,450 lb., according to the company.

Before the first B-26 was delivered to the Army Air Forces, 485,000 man-hours of engineering were required and an additional 440,000 were added to make the changes suggested by combat experience. The original engineering was crowded into eight months' time, a job that normally would require twice that long. It was done by placing every available man on the job with orders to speed it up.

In the Martin plants there are 422,099 man-hours of engineering per month, which sounds as if the B-26 should have been engineered in almost that time, but the time is divided among the several models produced by the company.

•

WPB Seeks Sub-Contractors Having Special Machine Tools

Washington

• • • **Producers** of variable condensers used in military radios are seeking sub-contractors who possess cylindrical grinding and worm grinding machine tools and close tolerance screw machines, WPB said last Friday.

This was brought out at a recent meeting of the industrial advisory committee on variable condensers conducted by Elmer Crane, chief of the WPB Components Section, Radio Division. The industry will request that variable condenser specifications be changed from the present requirement for silver plating to cadmium plating.

•

More Training Asked To Improve Machine Life

Buffalo

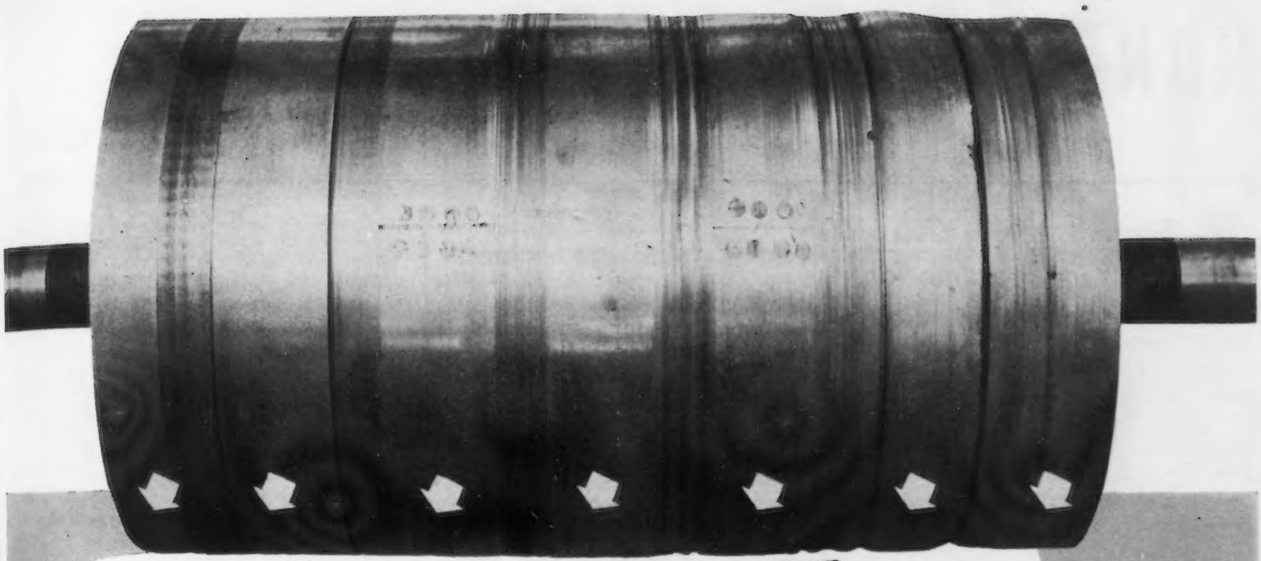
• • • **To save machines**, war plants should give "green horn operators" extensive training in the functions of a machine before they are placed on the job, in the opinion of Harold V. Coes of New York, president of the American Society of Mechanical Engineers.

Addressing the Buffalo Section of the ASME, Coes asserted "some of the machines in the nation's warplants are breaking down under today's strain in about a year because of improper mechanical attention. Properly cared for, they would be able to carry on for about twenty years or more."

•

Shipments Show Drop

• • • **The value of** 26,000 new machine tool units shipped during January was $117,432,000, according to a report issued today by WPB's Tool Division. This is a reduction of 11 per cent from the December figure of $131,960,000. The backlog of orders shows an 8.1 per cent drop in value from the December figure.



Dings Pulley
Bronze Spacer Rings
Outlast Steel!

THE illustration above shows a Dings Magnetic Pulley that has seen hard service for a period of over 15 years. Obviously, materials were permitted to get between the belt and the pulley surface causing wear of the steel pole pieces. But note that the *bronze* spacer rings are still in good condition! Mute testimony to the fact that this design is fundamentally sound and any arguments to the contrary that the use of bronze rings reduces wearing qualities or shortens pulley life are based on false premises.

Dings originated the use of the more expensive bronze rings because they were found to make the pulley more effective. As far as Dings knows, no other pulley manufacturer uses this design.

If you have a magnetic separation problem, consult Dings first. You will get the finest equipment available plus experience based on thousands of installations. Write today.

THE DINGS AIR-COOLED PULLEY

Dings air-cooled pulleys are built with serrated radial openings, longitudinal openings and an air-impeller hub design to provide rapid dissipation of heat generated by the coils. This results in more powerful operation because heat reduces magnetic pull. In addition it minimizes any possibility of the coils burning out. No other pulley gives a greater area of heat dissipation surface.

The air-cooled design plus bronze spacer rings makes possible the pulley that has long been advertised "most powerful on the market, size for size!" Ask for catalog.

Dings MAGNETIC SEPARATION HIGH INTENSITY

DINGS MAGNETIC SEPARATOR COMPANY, 516 E. SMITH ST. • MILWAUKEE, WISCONSIN

NON-FERROUS METALS

. . . Market Activities and Price Trends

New Bearing Alloys Can Lower Tin Consumption

• • • A means by which refined tin requirements can be cut by several thousand tons per year has been suggested by Battelle Memorial Institute in a report on its experiments with substitute alloys for leaded bronze bearings for possible use in machine tool and aircraft and automotive engine manufacture.

Investigations by Battelle research metallurgists have indicated that there are several alloys which possibly can be used as substitutes for the standard 80:10:10 bearing bronze without sacrifice of bearing quality. The use of the substitute alloys would reduce the refined tin requirements for this purpose 70 per cent or more, depending upon the alloy selected and the extent to which scrap was used in its production.

Bearing bronze most used for bushings in which the shaft runs directly on the bronze is constituted of 80 per cent Cu, 10 per cent Pb and 10 per cent Sn, called 80:10:10 alloy. Various emergency alternates have been proposed in which the tin content is dropped to as low as 6 per cent, but experiments have shown that satisfactory bearing alloys can be made with a tin content as low as 2.8 per cent by the substitution of antimony and copper or, for some purposes, with no tin at all by the use of copper, silver and phosphorus in the ratio 4:5:1 or copper only to replace the tin.

Secondary Copper Ingots

• • • It is expected that WPB will shortly order that all copper scrap be shipped only to ingot makers for refining. This action is intended to give better control over the recovery process and will probably result in higher yield per ton of scrap metal.

Canada has already taken this action. The demand for high grade copper scrap, such as trolley wire, is still extremely active.

GE Uses Cu Scrap

• • • A plan for the more efficient use of copper scrap has been introduced at one of the plants of the General Electric Co. which is applicable to other industries. The procedure heretofore followed in the production of busbars from ¼-in. copper bar stock which entails considerable drop-offs or unused ends, often of fair size had been to accumulate all such scrap for transfer to the salvage division for the use of the foundry in making copper and copper alloy castings.

Now all pieces having an area of four sq. in. or more are saved; odd-size pieces are separated for the manufacture of washers and spacers, and the more regular sizes are retained for use in the manufacture of larger parts.

With this scheme, some 90 per cent of the orders for parts less than eight in. long, and to be made from ¼-in. copper, are being filled with the use of copper scrap. An annual saving of 125,000 lb. of new bar copper stock is estimated.

Steel Fuse Booster

• • • For a design that saves 166,000,000 lb. of brass on the present procurement of M-20 A 1 booster bodies, used in the firing mechanisms of 75 mm. and 105 mm. shells Charles H. Godschall, manager of the metal division of Philco Corp., and Lieut. Colonel D. L. Woodberry, Army Ordnance, have been officially cited by the Ordnance Department of the United States Army for making "a marked contribution to the vital war production program to conserve critical material and machines."

To effect the savings, the threaded tube, 2¼ in. in diameter and 1¾ in. long, was redesigned so that it could be made in two parts, the outer shell being a steel stamping and the insert produced from steel bar stock. With older methods the entire part was machined from brass bar stock or forging. Engineering is now under way on a design to permit use of malleable iron castings as an alternate material.

Commission Starts Tour

La Paz (ALN)

• • • The North American commission investigating conditions in Bolivia's mining industry left last week for Oruro, first stop on a tour of mining districts which is expected to last four weeks. The commission will visit the Patino mines, the Hochschild mines and the Aramayo mines. At present the commission consists of 12 North Americans and seven Bolivian technicians headed by Dr. Juan Manual Balcazar, Minister of Labor. It will be joined later by U. S. Ambassador Pierre de Boal and several members of the Bolivian cabinet.

Sometime next month the commission will report its findings to the

PRODUCTION TOYS: Exact scaled reproductions of machinery and equipment in use at the Nashville plant of Vultee Aircraft which is building Vengeance dive bombers for the Allied Nations are used on a layout board to give an exact three-dimensional visualization of departmental planning. Each piece is scientifically placed for maximum machine and worker efficiency.

Brass Distributors May Order from Mills

• • • **Brass mill product distributors have been informed by the Copper Division, War Production Board, that they may place purchase orders with brass mills for a specified quantity of brass mill products to be delivered to them between March 1 and April 1.**

Orders placed by distributors with suppliers for specific amounts of brass mill products will be authorized by WPB for production and delivery between those dates.

This action is taken to increase warehouse stocks to levels which will permit satisfactory operation under CMP.

Labor Ministry. *La Calle*, a La Paz daily, in one of its articles commenting on the investigation wrote that since the commission would undoubtedly recommend increased wages and improved living conditions, the companies should refuse to comply unless the government lowered taxes.

Shares Bought

• • • **St. Joseph Lead Co.** has bought 195,000 shares of capital stock of the New Jersey Zinc Co. at $59.75. This purchase represents less than a 10 per cent interest in the zinc company, Clinton H. Crane, president of St. Joseph Lead Co., announced.

Secondary Beryllium Copper

• • • **To assure that copper** scrap containing beryllium will be remelted into beryllium copper products, WPB last Monday ordered that copper scrap and copper base alloy scrap containing 0.1 per cent or more beryllium be delivered only to persons specifically authorized by WPB to receive such scrap. This action was taken by issuance of Supplementary Order M-9-b.

Non-Ferrous Prices

(Cents per lb.)

Copper Electrolytic, Conn. Valley	12.00
Copper Electrolytic, New York	11.75
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis	8.25
Zinc, New York	8.67
Lead, St. Louis	6.35
Lead, New York	6.50
Aluminum, Virgin 99+%, delivered	15.00
Nickel, Electrolytic, base refinery	35.00
Magnesium, 99.8% ingot, per lb.	22.50

Miscellaneous Non-Ferrous Prices

ALUMINUM, No. 12 remelt, 14.50c.; No. 2, standard, 14.50c. a lb. ANTIMONY, Asiatic, New York, nominal; American, 14.50c. a lb., f.o.b. smelter. QUICKSILVER, $197 to $199 per 76 lb. flask, f.o.b. shipping point. BRASS INGOTS, commercial 85-5-5-5, 12.25c. a lb.

WICACO

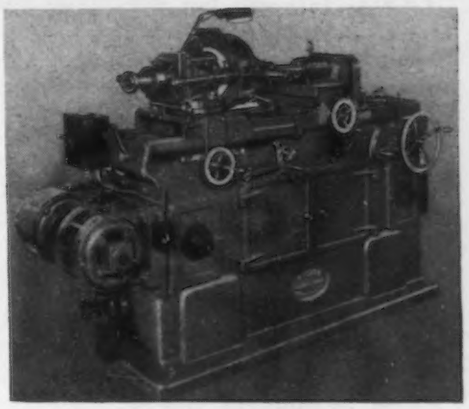
INTERNAL GRINDER

An ideal machine where accuracy is required above every other factor.

Developed originally to meet our own exacting requirements the Wicaco Internal Grinder has been for years a necessity for aircraft, automobile and diesel engine manufacturers requiring extreme precision.

Our engineers will cooperate gladly in solving your precision problems.

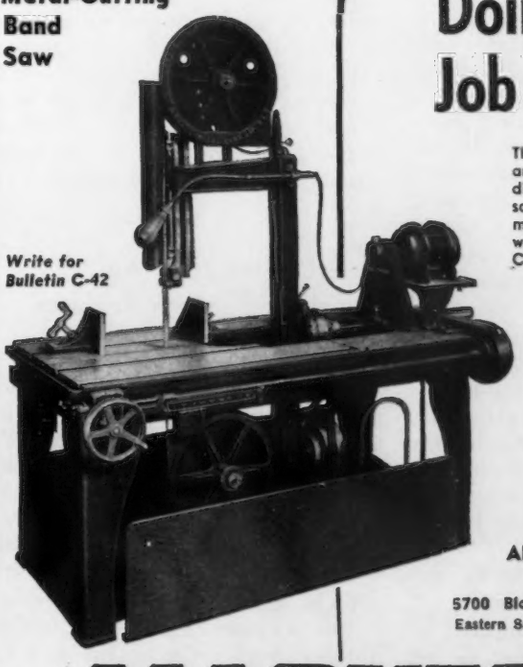
Write for complete details.



★ *Full Specifications Upon Request* ★

THE WICACO MACHINE CORP.
Wayne Junction **Philadelphia, Pa.**

Marvel No. 8 *Metal-Cutting* Band Saw



Write for Bulletin C-42

Doing its War Job Well!

The busiest tool in the tool rooms, an essential tool in the complete die shop and a time and money saver in the maintenance department, because "it does all things well." The MARVEL No. 8 Metal Cutting Band Saw (capacity 18" x 18") will snip off an ⅛" drill rod, rough out the largest billet or cut a perfect 45° mortice on the end of a large I-beam without any special setting-up. Its large planer type bed takes all work. Its continuous blade feeds into the work at any angle from 45° right to 45° left. It has a large removable vise and a combination hand and/or power feed.

ARMSTRONG-BLUM MFG. CO.
"The Hack Saw People"
5700 Bloomingdale Ave., Chicago, U.S.A.
Eastern Sales Office: 225 Lafayette St., New York

MARVEL SAWS

SCRAP

. . . Market Activities and Quotation Trends

Labor May Cause Scrap Drought by Fall

• • • As inferred last week, two main elements are plaguing the scrap industry — Selective Service and the price ceiling—but both add up to one common difficulty, labor shortage. Granted, the Selective Service has issued bulletins placing scrap workers in deferrable classifications but either due to the short time since the ruling's issuance or to local draft boards' contrariness, little relief has been seen from this move. Most implacable of the elements is high war plant wages which in spite of job stabilization programs is not reported to be alleviating the movement of workers out of the industry to any notable extent. St. Louis, one of the most critical labor areas in the industry, reports the situation on labor and prices, below.

Several special stories on scrap appear on pages 134-135.

St. Louis

• • • The manpower shortage among the scrapyards in the St. Louis industrial district, which began to manifest itself about six months ago, is becoming more and more acute, and may seriously affect the operations of the mills unless some relief is given.

The lure of higher wages in war plants is responsible for the drain of labor from the yards. Dealers say that they have been losing their best men because they cannot afford to pay the higher competitive scale due to the low ceiling price of scrap.

Although there has been a sharp decrease in receipts of scrap during the last six months, inventories in yards are higher now than at any time in this period. This is due, dealers say, to their inability to obtain the necessary labor to get out the scrap.

One large yard, with a capacity of 6000 to 8000 tons, was able to get out only 400 tons in January. Where 20 burners are required none is available at the moment. In some cases, scrap gathered in the December drive has not been handled because of labor scarcity. The same conditions exist in the yards in the smaller cities nearby, slowing up shipments.

Dealers are seeking relief through the Iron & Steel Scrap Institute. They want higher prices for scrap so that they can pay competitive wages to keep men at the job. In one individual case, the WPB has been asked for authority to raise wages, but this also would involve a higher ceiling for the fabricated article.

Mills are said to have piles sufficient for from two weeks to 30 days or slightly longer and are consuming it faster than it is coming in.

•

A Statement Corrected

• • • A statement appearing on page 150 of the Feb. 11 issue was interpreted by some in the scrap trade to mean that forking bushy turnings to segregate the short turnings for sale at a premium price was looked upon as shady practice. The true thought meant to be conveyed was that in some areas this practice is being frowned upon by consumers who were accustomed to receiving carloads of bushy turnings having a bottom layer of the easier to handle short turnings. The segregating practice is not to be construed as being shady and is sponsored by the government as wholesome. No indictment of the trade, stated or inferred, was intended.

•

Price Relief Seen Aid To Alloy Turnings Problem

New York

• • • With the over-supply and slow movement of high nickel turnings becoming an overbearing problem, OPA advanced a price allowance last week on nickel bearing pig iron which should encourage blast furnace operators to consume some of the thousands of available tons of these turnings to make alloy pig.

The price set by OPA permits blast furnace operators to charge $2 a ton extra for pig iron bearing from 0.05 to 0.074 per cent nickel and $1 per ton additional for each added 0.025 per cent of the element. This allowance was set forth in Amendment 5 to RPS 10 and is effective March 3.

Since the quantities and similarly slow movement of high tungsten and high molybdenum turnings have also represented a problem to the scrap trade it is believed that some concession to bring about their disposal will also be forthcoming in the near future.

In addition to answering a serious need of the trade, the use of alloy turnings is deemed necessary as a conservation measure for the strategic metals involved. As the importance of this conservation grows it is expected that each steel producer will be asked to set aside a specific blast furnace for the utilization of alloy turnings.

•

BOSTON—Yards generally report little material coming out other than shop and this is by no means plentiful. Light snows over the weekend made unfavorable mud conditions in many yards, thus contributing to the slowness of things. Brokers report little doing but anticipate some pickup shortly.

•

BIRMINGHAM — The market in cast scrap in this area is now practically nonexistent. This is attributed to large inventories being carried by foundries, margin of cost between pig iron and cast grades and the slowing up of production by pipe shops. Still another factor is the freer movement of pig iron, occasioned in part by increased blast furnace capacity. Flow of scrap of all kinds to dealers yards is the smallest in many months but steel mills continue to have considerable supplies.

•

PITTSBURGH — Demand and supply continue in fairly good balance here with no signs of tight spots. The alloy turning situation continues to be the main topic of conversation, and sooner or later will probably reach a satisfactory solution.

•

ST. LOUIS—The shortage of manpower in the St. Louis area is becoming increasingly serious, slowing down receipts of scrap and resulting in mills digging into their piles to maintain the present high rate of production. Stocks in hands of yards continue to pile up because they lack the necessary men to handle the scrap. Railroads are reported to be improving in shipments.

•

CINCINNATI—Recent scrap drives in this area failed to produce tonnage comparable to that of last fall. At the same time, dealers indicate that the quality is less desirable than that on previous drives. The supply in the area is reported to be adequate to take care of the present melts until the cold weather break and the usual uptrend in collections begin. Foundry grades continue to

WMI Loses Head

Pittsburgh

• • • War Materials, Inc., lost its second president in the past several months when B. C. Moise resigned here last week. His resignation was requested by the Metals Reserve Co., parent of WMI.

Moise's resignation follows his blast of a week ago, when he blamed WPB for the "Shameful record" of WMI. At that time he said so many directives were issued to curb activities that WMI had only been able to recover 8522 tons of scrap.

The demand for the resignation of Moise was not unexpected in view of his flat statement that he did not intend to further waste the taxpayers' money under such conditions. Nelson, WPB head is said to feel that the scrap situation does not now warrant a large scale WMI.

be most active with the supply not quite as extensive as on steel grades.

•

BUFFALO—Signing of all scrapyard operators to an anti-labor-piracy pact was reported under discussion in the trade this week. Although worth no more than any other gentleman's agreement, it was thought such a move might further reduce the temptation to swipe the other fellow's help. The week brought considerable improvement in business, both in receipts and shipments. Yards reported the movement of a satisfactory quantity of turnings to outside consumers, relieving the congestion resulting from an embargo on the stuff by the district's biggest buyer. That embargo stands.

•

CHICAGO — Still waiting a decision from WLB on the petition of local scrap dealers for permission to raise wages to meet war plant competition, the scrap trade here foresees a very critical situation very shortly if the wage question is not settled quickly. Thus far backlogs have served to make up the deficiency in shipments, but the time is not far distant when these backlogs will disappear and mills will have to depend upon shipments alone for supplies.

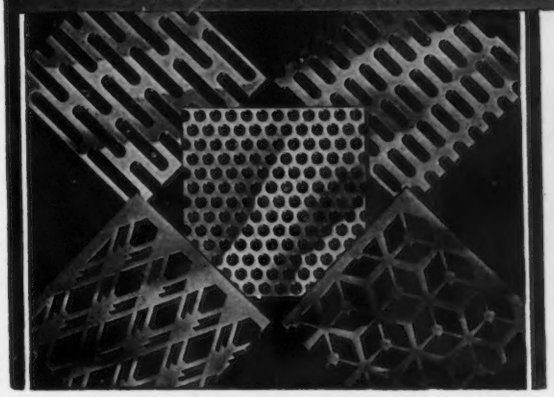
•

NEW YORK—Both demand and supply are slow here, with cupola cast, stove plates and motor blocks, cleaned and uncleaned, particularly slow in moving from the yards. Some dealers report that lack of labor is discouraging to the piling up of backlogs of unprepared scrap.

•

PHILADELPHIA—Yards here are reported to be operating at about 50 per cent, with the labor situation continually growing worse. Mills are taking somewhat more scrap, but not as much is moving to the yards as formerly. There is reported to be little accumulation of unprepared scrap and there is foreshadowed the need for another scrap drive and the labor to handle the material obtained.

PERFORATED METALS



•

INDUSTRIAL AND ORNAMENTAL

•

ANY METAL

ANY PERFORATION

•

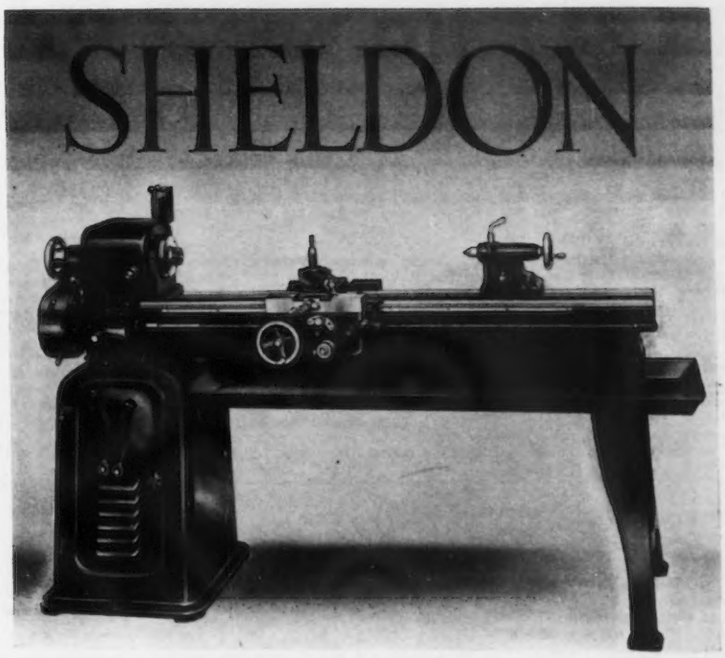
ARE ESSENTIAL IN TIMES OF WAR AND PEACE

They are used in the manufacture of airplanes, battleships, explosives and in many important and essential industries such as the processing of grain, food products, petroleum, coal, etc. We make all sizes and shapes of holes to meet the most exacting conditions.

The Harrington & King Perforating Co.

5657 FILLMORE ST., CHICAGO — 114 LIBERTY ST., NEW YORK

SHELDON



BBU-1242 WQ Precision Lathe

This quality 12 in. ball bearing tool room lathe is built for precision work and will retain its accuracy under long and hard usage. It has extra collet capacity (to 1" round), the finest precision ball or roller bearings obtainable, an improved heavy-duty, double wall apron with power cross feed; full quick change gears and full bowl headstock. Its improved Sheldon 4-speed, V-belt, lever-clutch operated, underneath motor drive is entirely enclosed in the pedestal leg and has antifriction bearings. It is so designed that spindle belts operate thru a *standard* 1-piece bed. This bed is bridge-braced with heavy cross girts and has hand scraped ways—2 V-ways and 2 flat ways.

If interested in 10", 11" and 12" quality lathes be sure to see the SHELDON.

SHELDON MACHINE CO., INC., 4240 N. Knox Ave., Chicago, U.S.A.

IRON AND STEEL (OTHER THAN RAILROAD) SCRAP

(All Prices Are Per Gross Ton)

	BASIC OPEN HEARTH GRADES		BLAST FURNACE GRADES				ELECTRIC FURNACE, ACID OPEN HEARTH AND FOUNDRY GRADES									
							Low Phos.		Heavy Structural and Plate			Foundry Steel				
	No. 1 & 2 Hvy. Melt. No. 1 Cp. Blk. Shts. No. 1 & 2 Bundles No. 1 Busheling	Unbaled* Machine Shop Turnings	Mixed Borings and Turnings	Cast Iron Borings	Shoveling Turnings	No. 2 Busheling	Billet, Bloom, Forge Crops	Bar Crops, Punchings, Plate Scrap and Cast Steel	3 ft. and Under	2 ft. and Under	1 ft. and Under	2 ft. and Under	1 ft. and Under	Auto. Springs, and Crankshafts	Alloy Free Low Phos. and Sulphur Turnings	Heavy Axle and Forge Turn. First Cut	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Monessen, Midland, Johnstown, Sharon, Canton, Steubenville, Warren, Youngstown, Weirton	$20.00	$15.00	$15.00	$16.00	$17.00	$17.50	$25.00	$22.50	$21.50	$22.00	$22.50	$21.50	$22.00	$21.00	$18.00	$19.50	$21.00
Cleveland, Middletown, Cincinnati, Portsmouth	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Chicago, Claymont, Coatesville, Conshohocken, Harrisburg, Phoenixville, Sparrows Point	18.75	13.75	13.75	14.75	15.75	16.25	23.75	21.25	20.25	20.75	21.25	20.25	20.75	19.75	16.75	18.25	19.75
Ashland, Ky.	19.50	14.50	14.50	15.50	16.50	17.00	24.50	22.00	21.00	21.50	22.00	21.00	21.50	20.50	17.50	19.00	20.50
Buffalo, N. Y.	19.25	14.25	14.25	15.25	16.25	16.75	24.25	21.75	20.75	21.25	21.75	20.75	21.25	20.25	17.25	18.75	20.25
Bethlehem, Pa.; Kokomo, Ind.	18.25	13.25	13.25	14.25	15.25	15.75	23.25	20.75	19.75	20.25	20.75	19.75	20.25	19.25	16.25	17.75	19.25
Duluth, Minn.	18.00	13.00	13.00	14.00	15.00	15.50	23.00	20.50	19.50	20.00	20.50	19.50	20.00	19.00	16.00	17.50	19.00
Detroit, Mich.	17.85	12.85	12.85	13.85	14.85	15.35	22.85	20.35	19.35	19.85	20.35	19.35	19.85	18.85	15.85	17.35	18.85
Toledo, Ohio	.....	12.85	12.85	13.85	14.85	15.35	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
St. Louis, Mo.	17.50	12.50	12.50	13.50	14.50	15.00	22.50	20.00	19.00	19.50	20.00	19.00	19.50	18.50	15.50	17.00	18.50
Atlanta, Ga.; Alabama City, Ala.; Birmingham, Los Angeles; Pittsburg, Cal.; San Francisco	17.00	12.00	12.00	13.00	14.00	14.50	22.00	19.50	18.50	19.00	19.50	18.50	19.00	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	11.50	11.50	12.50	13.50	14.00	21.50	19.00	18.00	18.50	19.00	18.00	18.50	17.50	14.50	16.00	17.50
Seattle, Wash.	14.50	9.50	9.50	10.50	11.50	12.00	19.50	17.00	16.00	16.50	17.00	16.00	16.00	15.00	12.50	14.00	15.50

*Baled turnings are $5 per gross ton higher.

BUNDLES: Tin can bundles are $4 below dealers' No. 2 bundles. No. 3 bundles are $2 less than No. 1 heavy melting.

AT NEW YORK city or Brooklyn, the maximum shipping point price is $15.33 for No. 1 heavy melting, f.o.b. cars, f.a.s. vessel or loaded on truck. Other grades carry differentials similar to those in table. New Jersey prices must be computed on basis of all-rail. At Boston the maximum is $15.05 for No. 1 f.o.b. cars, f.a.s. vessel or loaded on trucks. Shipments from a New England shipping point to a consumer outside New England carry maximum transportation charge of $6.65 per ton.

SWITCHING CHARGES: Deductions for shipping points within basing points (cents per gross ton) are: Pittsburgh, Brackenridge, 55c.; Midland, Johnstown, Sharon, Youngstown, Warren, Weirton, Cleveland, Toledo, Los Angeles, San Francisco, 42c.; Butler, Monessen, Canton, Steubenville, Cincinnati*, Portsmouth, Ashland, Coatesville, Harrisburg, Phoenixville, Bethlehem, Kokomo, Duluth, St. Louis, 28c.; Buffalo, Claymont, 36c.; Conshohocken, 11c.; Atlanta, Birmingham, 32c.; Pittsburg, Cal., 42c.; Middletown, 14c.; Sparrow's Point, 11c.; Chicago, 84c.; Detroit, 53c.; Alabama City, 26c.; Minnequa, 22c.; Seattle, 38c. *At Cincinnati, for basic open hearth grades, foundry steel and auto springs and crankshafts, deduct 80c. per ton.

PITTSBURGH basing point includes switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Cincinnati basing point includes Newport, Ky., switching district. St. Louis includes switching districts of Granite City, East St. Louis, Madison, Ill. San Francisco includes switching districts of S. San Francisco, Niles and Oakland, Cal.

MAXIMUM prices of inferior grades shall continue to bear same differential below corresponding grades as existed during the period Sept. 1, 1940, to Jan. 31, 1941. Superior grades cannot be sold at a premium without approval of OPA. Special preparation charges in excess of the above prices are banned. Whenever any electric furnace or foundry grades are purchased for open hearth or blast furnace use, prices may not exceed the prices above for the corresponding open hearth grades.

MAXIMUM SHIPPING POINT PRICE—Where shipment is by rail or vessel, or by combination of rail and vessel, the scrap is at its shipping point when placed f.o.b. railroad car or f.a.s. vessel. In such cases, the maximum shipping point prices shall be: (a) For shipping points located within a basing point, the price listed in the table above for the scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point and (b) for shipping points located outside the basing point, the price in table above at the most favorable basing point minus the lowest transportation charge by rail or water or combination thereof. In lieu of dock charge add 75c. a ton*, but 50c. if moved by deck scow or railroad lighter. Shipping by motor vehicle: The scrap is at its shipping point when loaded. For shipping points located within basing points take price listed in table minus applicable switching charge. If located outside a basing point, the price at the most favorable basing point minus lowest established charge for transporting by common carrier. If no established transportation rate exists, the customary costs are deducted. Published dock charges prevail. If unpublished include 75c.* For exceptions see official order.

UNPREPARED SCRAP: For unprepared scrap, maximum prices shall be $3.50 (and in the case of the material from which No. 1, No. 2, and No. 3 bundles are made $4) less the maximum prices for the corresponding grade or grades of prepared scrap. In no case, however, shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Converter may charge $2.50 per ton on consumer-owned unprepared remote scrap (see order). A preparation-in-transit charge for allocated unprepared scrap is provided.

Maximum price of all scrap in a vehicle is that of the lowest price grade in the shipment. This limitation does not apply to vessel shipments if grades are segregated.

Where scrap is to undergo preparation prior to its arrival at the point of delivery, such scrap is not at its shipping point, as that phrase is defined above, until after preparation has been completed. For special preparation charges, consult official order.

CHEMICAL BORINGS: No. 1 (new, clean, containing not more than 1 per cent oil), $1 less than No. 1 heavy melting; No. 2 (new, clean, containing not more than 1.5 per cent oil), $2 less than No. 1 heavy melting. If loaded in box cars add 75c.

UNPREPARED CAST IRON SCRAP—Except for heavy breakable cast, unprepared scrap is given a price ceiling of $2.50 per ton less than the maximum prices for the corresponding grade of prepared cast iron scrap. Where scrap is to undergo preparation prior to arrival at the point of delivery, such scrap is not considered at shipping point until preparation is completed.

Consumers of cast scrap may pay the shipping point price plus established charge for transporting the scrap to their plants. In the case of deliveries by truck, the cast scrap buyer must obtain from the seller a certification, made out to OPA.

*At Memphis 50c.; Great Lakes ports $1; New England $1.25.

RAILROAD SCRAP

	No. 1 RR Heavy Melting	Scrap Rails	Rails for Rerolling	Scrap Rails: 3 ft. and Under	Scrap Rails: 2 ft. and Under	Scrap Rails: 18 in. and Under
Cleveland, Cincinnati, Ashland, Portsmouth, Middletown	$20.50	$21.50	$23.00	$23.50	$23.75	$24.00
Canton, Pittsburgh Sharon, Steubenville, Wheeling, Youngstown	21.00	22.00	23.50	24.00	24.25	24.50
Chicago, Philadelphia, Sparrows Pt., Wilmington	19.75	20.75	22.25	22.75	23.00	23.25
Birmingham, Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
Kokomo, Ind.	19.25	20.25	21.75	22.25	22.50	22.75
Seattle	15.50	16.50	18.00	18.50	18.75	19.00
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00

CAST IRON SCRAP

	Group A	Group B	Group C
No. 1 cupola cast	$18.00	$19.00	$20.00
Clean auto cast	18.00	19.00	20.00
Unstripped motor blocks	15.50	16.50	17.00
Stove Plate	17.00	18.00	19.00
Heavy Breakable Cast	15.50	16.50	17.00
Charging Box Size Cast	17.00	18.00	19.00
Misc. Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C: States not named in A and B; switching district of Kansas City, Kan., Mo.

. . . Comparison of Prices

Advances Over Past Week in **Heavy Type**; Declines in *Italics*. [Prices Are F.O.B. Major Basing Points]

Flat Rolled Steel: (Cents Per Lb.)	Mar. 2, 1943	Feb. 23, 1943	Feb. 16, 1943	Mar. 3, 1942
Hot rolled sheets	2.10	2.10	2.10	2.10
Cold rolled sheets	3.05	3.05	3.05	3.05
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50
Hot rolled strip	2.10	2.10	2.10	2.10
Cold rolled strip	2.80	2.80	2.80	2.80
Plates	2.10	2.10	2.10	2.10
Plates, wrought iron	3.80	3.80	3.80	3.80
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00
Tin and Terne Plate: (Dollars Per Base Box)				
Tin plate, standard cokes	$5.00	$5.00	$5.00	$5.00
Tin plate, electrolytic	4.50	4.50	4.50	4.50
Special coated mfg. ternes	4.30	4.30	4.30	4.30
Bars and Shapes: (Cents Per Lb.)				
Merchant bars	2.15	2.15	2.15	2.15
Cold finished bars	2.65	2.65	2.65	2.65
Alloy bars	2.70	2.70	2.70	2.70
Structural shapes	2.10	2.10	2.10	2.10
Stainless bars (No. 302)	24.00	24.00	24.00	24.00
Wrough iron bars	4.40	4.40	4.40	4.40
Wire and Wire Products: (Cents Per Lb.)				
Plain wire	2.60	2.60	2.60	2.60
Wire nails	2.55	2.55	2.55	2.55
Rails: (Dollars Per Gross Ton)				
Heavy rails	$40.00	$40.00	$40.00	$40.00
Light rails	40.00	40.00	40.00	40.00
Semi-Finished Steel: (Dollars Per Gross Ton)				
Rerolling billets	$34.00	$34.00	$34.00	$34.00
Sheet bars	34.00	34.00	34.00	34.00
Slabs	34.00	34.00	34.00	34.00
Forging billets	40.00	40.00	40.00	40.00
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00
Wire Rods and Skelp: (Cents Per Lb.)				
Wire rods	2.00	2.00	2.00	2.00
Skelp (grvd)	1.90	1.90	1.90	1.90

Pig Iron: (Per Gross Ton)	Mar. 2, 1943	Feb. 23, 1943	Feb. 16, 1943	Mar. 3, 1942
No. 2 fdy., Philadelphia	$25.89	$25.89	$25.89	$25.84
No. 2, Valley furnace	24.00	24.00	24.00	24.00
No. 2, Southern Cin'ti	24.68	24.68	24.68	24.06
No. 2, Birmingham	20.38	20.38	20.38	20.38
No. 2, foundry, Chicago†	24.00	24.00	24.00	24.00
Basic, del'd eastern Pa.	25.39	25.39	25.39	25.34
Basic, Valley furnace	23.50	23.50	23.50	23.50
Malleable, Chicago†	24.00	24.00	24.00	24.00
Malleable, Valley	24.00	24.00	24.00	24.00
L. S. charcoal, Chicago	31.34	31.34	31.34	31.34
Ferromanganese‡	135.00	135.00	135.00	120.00

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton.
‡For carlots at seaboard.

Scrap: (Per Gross Ton)				
Heavy melting steel, P'gh.	$20.00	$20.00	$20.00	$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	18.75
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	18.75
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	17.85
Low phos. plate, Youngs'n	22.50	22.50	22.50	23.00
No. 1 cast, Pittsburgh	20.00	20.00	20.00	20.00
No. 1 cast, Philadelphia	20.00	20.00	20.00	20.00
No. 1 cast, Ch'go	20.00	20.00	20.00	20.00
Coke, Connellsville: (Per Net Ton at Oven)				
Furnace coke, prompt	$6.50	$6.50	$6.00	$6.00
Foundry coke, prompt	7.375	7.375	6.875	6.875
Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Copper, electro., Conn.	12.00	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00
Tin (Straits), New York	52.00	52.00	52.00	52.00
Zinc, East St. Louis	8.25	8.25	8.25	8.25
Lead, St. Louis	6.35	6.35	6.35	6.35
Aluminum, Virgin, del'd	15.00	15.00	15.00	15.00
Nickel, electrolytic	35.00	35.00	35.00	35.00
Magnesium, ingot	20.50	20.50	20.50	22.50
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 168 to 174.

Composite Prices . . .

	FINISHED STEEL	PIG IRON	SCRAP STEEL
Mar. 2, 1943	2.30467c. a Lb.	23.61 a Gross Ton	$19.17 a Gross Ton
One week ago	2.30467c. a Lb.	23.61 a Gross Ton	$19.17 a Gross Ton
One month ago	2.30467c. a Lb.	23.61 a Gross Ton	$19.17 a Gross Ton
One year ago	2.30467c. a Lb.	23.61 a Gross Ton	$19.17 a Gross Ton

	FINISHED STEEL HIGH	FINISHED STEEL LOW	PIG IRON HIGH	PIG IRON LOW	SCRAP STEEL HIGH	SCRAP STEEL LOW
1943	2.30467c.,	2.30467c.,	$23.61	$23.61	$19.17	$19.17
1942	2.30467c.,	2.30467c.,	23.61	23.61	19.17	19.17
1941	2.30467c.,	2.30467c.,	$23.61, Mar. 20	$23.45, Jan. 2	$22.00, Jan. 7	$19.17, Apr. 10
1940	2.30467c., Jan. 2	2.24107c., Apr. 16	23.45, Dec. 23	22.61, Jan. 2	21.83, Dec. 30	16.04, Apr. 9
1939	2.35367c., Jan. 3	2.26689c., May 16	22.61, Sept. 19	20.61, Sept. 12	22.50, Oct. 3	14.08, May 16
1938	2.58414c., Jan. 4	2.27207c., Oct. 18	23.25, June 21	19.61, July 6	15.00, Nov. 22	11.00, June 7
1937	2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16	21.92, Mar. 30	12.67, June 9
1936	2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11	17.75, Dec. 21	12.67, June 9
1935	2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14	13.42, Dec. 10	10.33, Apr. 29
1934	2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27	13.00, Mar. 13	9.50, Sept. 25
1933	1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	13.56, Jan. 3	12.25, Aug. 8	6.75, Jan. 3
1932	1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.43, July 5
1931	1.99626c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3

Weighted index based on steel bars, beams, tank plates, wire, rails, black pipe, hot and cold-rolled sheets and strip, representing 78 per cent of the United States output. Index recapitulated in Aug. 28, 1941, issue.

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

Prices of Finished Iron and Steel...

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, reductions, and in most cases freight absorbed to meet competition. Delivered prices do not reflect new 3 per cent tax on freight rates.

Basing Point → / Product ↓	Pittsburgh	Chicago	Gary	Cleveland	Birmingham	Buffalo	Youngstown	Sparrows Point	Granite City	Middletown, Ohio	Gulf Ports, Cars	Pacific Ports, Cars[10]	DELIVERED TO Detroit	New York	Philadelphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.22¢	2.35¢	2.28¢
Cold rolled[1]	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.17¢	3.41¢	3.39¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.75¢	3.68¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.47¢	3.73¢	3.69¢
Long ternes[2]	3.80¢		3.80¢									4.55¢		4.18¢	4.14¢
STRIP															
Hot rolled[3]	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.22¢	2.48¢	
Cold rolled[4]	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester—3.00¢)					2.92¢	3.18¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.58¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester—3.35¢)					3.07¢	3.33¢	
TIN MILL PRODUCTS															
Coke tin plate, base box	$5.00	$5.00	$5.00						$5.10					5.38¢	5.34¢
Electrolytic tin plate, box	$4.50		$4.50												
Black plate, 29 gage[5]	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢[12]			3.39¢
Mfg. ternes, special box	$4.30	$4.30	$4.30						$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth—2.25¢)			2.52¢	2.80¢	2.27¢	2.51¢	2.49¢
Rail steel[6]	2 15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.52¢	2.80¢			
Reinforcing (billet)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.52¢	2.55¢[12]	2.27¢	2.40¢	
Reinforcing (rail)[7]	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢				2.52¢	2.55¢[13]	2.27¢		2.49¢
Cold finished[8]	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit—2.70c)					3.01¢	2.99¢
Alloy, hot rolled	2.70¢	2.70c				2.70¢		Bethlehem, Massillon, Canton—2.70c)					2.82¢		
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢							3.47¢		
								(Coatesville and Claymont—2.10¢)							
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢[11]		2.47¢	2.65¢	2.33¢	2.30¢	2.155¢
Floor plates	3.35¢	3.35¢									3.72¢	4.00¢		3.78¢	3.69¢
Alloy	3.50¢	3.50¢			(Coatesville—3.50¢)						3.97¢	4.15¢		3.71¢	3.60¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem—2.10¢)			2.47¢	2.75¢		2.28¢	2.33¢
SPRING STEEL, C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢			(Worcester—3.00¢)								
0.51 to 0.75 Carbon	4.30¢			4.30¢			(Worcester—4.50¢)								
0.76 to 1.00 Carbon	6.15¢			6.15¢			(Worcester—6.35¢)								
1.01 to 1.25 Carbon	8.35¢			8.35¢			(Worcester—8.55¢)								
WIRE[9]															
Bright[14]	2.60¢	2.60¢		2.60¢	2.60¢		(Worcester—2.70c)					3.10¢			2.94¢
Galvanized	add proper size extra and galvanized extra to bright wire base, above.														
Spring (High Carbon)	3.20¢	3.20¢		3.20¢			(Worcester—3.30¢)					3.70¢			3.54¢
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢						2.95¢			2.74¢

[1] Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. [2] Unassorted 8-lb. coating. [3] Widths up to 12 in. [4] Carbon 0.25 per cent and less. [5] Applies to certain width and length limitations. [6] For merchant trade. [7] Prices for straight length material only, from a producer to a consumer. Functional discount of 25c. per 100 lb. to fabricators. [8] Also shafting. For quantities of 20,000 to 39,999 lb. [9] Carload lot to manufacturing trade. [10] These prices do not apply if the customary means of transportation (rail and water) are not used. [11] Ship plates only. [12] Boxed. [13] Portland and Seattle price, San Francisco price is 2.50c. [14] This bright wire base price to be used in figuring annealed and bright finish wires, commercial spring wire and galvanized wire.

GOVERNMENT CEILINGS—Price Schedule No. 6 issued April 16, 1941, governs steel mill prices; Price Schedule No. 49 governs warehouse prices, which are on another page of this issue.

EXCEPTIONS TO PRICE SCHEDULE No. 6—On hot rolled carbon bars, Phoenix Iron Co. may quote 2.40c. at established basing points; Calumet Steel division of Borg Warner may quote 2.35c., Chicago, on bars from its 8 in. mill; Joslyn Mfg. Co. may quote 2.35c., Chicago base On rail steel bars Sweets Steel Co. may quote 2.33c., f.o.b. mill. On hot rolled sheets, Andrews Steel Co. may quote for shipment to Detroit area on Middletown base. On galvanized sheets, Andrews Steel may quote 3.75c., at established basing points. On hot rolled strip, Joslyn Mfg. Co. may quote 2.30c., Chicago base. On plates, Granite City Steel Co. may quote 2.35c., f.o.b. mill, and Central Iron & Steel Co. may quote 2.20c., f.o.b. basing points. On shapes, Phoenix Iron Co. may quote 2.35c., established basing points and 2.50c. Phoenixville for export.

On rail steel merchant bars, Eckels-Nye Corp. may charge 2.40c. On tubing, South Chester Tube Co. may price Gulf or Pacific Coast all-rail shipments and shipments west of Harrisburg on basis of f.o.b. Chester. On lend-lease sales to eastern seaboard, Sheffield Steel Co. and Colorado Fuel & Iron Corp. may sell f.o.b. mill. SEMI-FINISHED STEEL—Follansbee Steel Corp. may sell forging billets at $49.50 f.o.b. Toronto; Continental Steel Corp. may sell Acme Steel Co. at $34 for rerolling billets plus extras and freight; Ford Motor Co. may sell rerolling billets at $34 f.o.b. Dearborn; Andrews Steel Co. may sell forging billets at $50 at established basing points and slabs at $41; Empire Sheet and Tin Plate may sell slabs at $41 at established basing points and sheet bars at $39 f.o.b. mill; on lend lease sales Northwestern Steel & Wire Co. may charge $41 per gross ton f.o.b. mill for rerolling billets; and lend lease sales Wheeling Steel Corp. may charge $36 per ton for small billets, f.o.b. Portsmouth and $37 per ton sheet bars f.o.b. Portsmouth; Laclede Steel Co. on semifinished sales for lend-lease shipped to eastern seaboard may use Chicago basing point prices f.o.b. Alton and Madison, Ill. ALLOY STEEL BARS—Texas Steel Co. may use Chicago base f.o.b. Fort Worth.

SEMI-FINISHED STEEL

For exceptions, see preceding page

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are $2.25 higher; f.o.b. Duluth, billets only, $2 higher. Delivered prices do not reflect new per cent tax on freight rates.

	Per Gross Ton
Rerolling	$34.00
Forging quality	40.00

Alloy Steel: Pittsburgh, Chicago, Canton, Massillon, Buffalo, or Bethlehem, per gross ton ... $54.00

Shell Steel

	Per Gross Ton
3 in. to 12 in.	$52.00
12 in. to 18 in.	54.00
18 in. and over	56.00

Basic open hearth shell steel, f.o.b. Pittsburgh, Chicago, Buffalo, Gary, Cleveland, Youngstown and Birmingham. Prices delivered Detroit are $2.25 higher.

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

	Per Gross Ton
Open hearth or bessemer	$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

	Per Lb.
Grooved, universal and sheared	1.90c.

Wire Rods

(No. 5 to 9/32 in.)

	Per Lb.
Pittsburgh, Chicago, Cleveland	2.00c.
Worcester, Mass.	2.10c.
Birmingham	2.00c.
San Francisco	2.50c.
Galveston	2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

TOOL STEEL

(F.o.b. Pittsburgh, Bethlehem, Syracuse)

	Base per lb.
High speed	67c.
Straight molybdenum	54c.
Tungsten-molybdenum	57½c.
High-carbon-chromium	43c.
Oil hardening	24c.
Special carbon	22c.
Extra carbon	18c.
Regular carbon	14c.

Warehouse prices east of Mississippi are 2c. a lb. higher; west of Mississippi, 1c. higher.

CORROSION AND HEAT-RESISTING STEEL

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.725c.	16.15c.	19.125c.	23.375c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	35.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

NATIONAL EMERGENCY STEELS (Hot Rolled)

Extras for Alloy Content

Designation	CHEMICAL COMPOSITION LIMITS, PER CENT								Basic Open-Hearth		Electric Furnace	
	Carbon	Manganese	Phosphorus Max.	Sulphur Max.	Silicon	Chromium	Nickel	Molybdenum	Bars and Bar Strip	Billets, Blooms and Slabs	Bars and Bar Strip	Billets, Blooms and Slabs
NE 1330	.28/ .33	1.60/1.90	.040	.040	.20/ .35				.10c	$2.00		
NE 1335	.33/ .38	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1340	.38/ .43	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1345	.43/ .48	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 1350	.48/ .53	1.60/1.90	.040	.040	.20/ .35				.10	2.00		
NE 8020	.18/ .23	1.00/1.30	.040	.040	.20/ .35			.10/ .20	.45	9.00	.95c	$19.00
NE 8442*	.40/ .45	1.30/1.60	.040	.040	.20/ .35			.30/ .40	.90	18.00	1.40	28.00
NE 8613	.12/ .17	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8615	.13/ .18	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8617	.15/ .20	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8620	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8630	.28/ .33	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8635	.33/ .38	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8637	.35/ .40	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8640	.38/ .43	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8642	.40/ .45	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8645	.43/ .48	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8650	.48/ .53	.75/1.00	.040	.040	.20/ .35	.40/ .60	.40/ .70	.15/ .25	.75	15.00	1.25	25.00
NE 8720	.18/ .23	.70/ .90	.040	.040	.20/ .35	.40/ .60	.40/ .70	20/ 30	.80	16.00	1.30	26.00
NE 9255	.50/ .60	.70/ .95	.040	.040	1.80/2.20				.40c	8.00		
NE 9260	.55/ .65	.75/1.00	.040	.040	1.80/2.20				.40	8.00		
NE 9262	.55/ .65	.75/1.00	.040	.040	1.80/2.20	.20/ .40			.65	13.00		
NE 9415	.13/ .18	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30c	$26.00
NE 9420	.18/ .23	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9422	.20/ .25	.80/1.10	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9430	.28/ .33	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9435	.33/ .38	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9437	.35/ .40	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9440	.38/ .43	.90/1.20	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.80	16.00	1.30	26.00
NE 9442	.40/ .45	1.00/1.30	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9445	.43/ .48	1.00/1.30	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9450	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.20/ .40	.20/ .50	.08/ .15	.85	17.00	1.35	27.00
NE 9537*	.35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9540*	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9542*	.40/ .45	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ .25	1.20	24.00	1.70	34.00
NE 9550*	.48/ .53	1.20/1.50	.040	.040	.40/ .60	.40/ .60	.40/ .70	.15/ 25	1.20	24.00	1.70	34.00
NE 9630	.28/ .33	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9635	.33/ .38	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9637	35/ .40	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9640	.38/ .43	1.20/1.50	.040	.040	.40/ .60	.40/ .60			.80	16.00	1.30	26.00
NE 9642	.40/ .45	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00
NE 9645	.43/ .48	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00
NE 9650	.48/ .53	1.30/1.60	.040	.040	.40/ .60	.40/ .60			.85	17.00	1.35	27.00

***Recommended for large sections only.**

Note: The extras shown above are in addition to a base price of 2.70c. per 100 lb., on finished products and $54 per gross ton on semi-finished steel major basing points and are in cents per 100 lb. and dollars per gross ton in semi-finished.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per Lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

F.o.b. Granite City, add 10c. per 100 lb. on field grade to and including dynamo. Pacific ports add 75c. per 100 lb. on all grades.

WIRE PRODUCTS

To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham

	Base per Keg
Standard wire nails	$2.55
Coated nails	2.55
Cutnails, carloads	3.85
	Base per 100 Lb.
Annealed fence wire	$3.05
Annealed galvanized fence wire	3.40
	Base Column
Woven wire fence*	67
Fence posts (carloads)	69
Single loop bale ties	59
Galvanized barbed wire†	70
Twisted barbless wire	70

*15½ gage and heavier. †On 80-rod spools in carload quantities.

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60 lb., gross ton	$40.00
Angle bars, 100 lb.	2.70
(F.o.b. Basing Points)	*Per Gross Ton*
Light rails (from billets)	$40.00
Light rails (from rail steel)	39.00
	Base per Lb.
Cut spikes	3.00c.
Screw spikes	5.15c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts	4.75c.
Track bolts, heat treated, to railroads	5.00c
Track bolts, jobbers discount	63-5

Basing Points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, 112 Sheets)

	20x14 in.	20x28 in
8-lb. coating I.C.	$6.00	$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Machine and Carriage Bolts:

	Per Cent off List
½ in. & smaller x 6 in. & shorter	65½
9/16 & ⅝ in. x 6 in. & shorter	63½
¾ to 1 in. x 6 in. & shorter	61
1⅛ in. and larger, all length	59
All diameters over 6 in. long	59
Lag, all sizes	62
Plow bolts	65

Nuts, Cold Punched or Hot Pressed:
(Hexagon or Square)

½ in. and smaller	62
9/16 to 1 in. inclusive	59
1⅛ to 1½ in. inclusive	57
1⅝ in. and larger	56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	**U.S.S.**	**S.A.E.**
7/16 in. and smaller		64
½ in. and smaller	62	..
½ in. through 1 in.	..	60
9/16 to 1 in.	59	..
1⅛ in. through 1½ in.	57	58
1⅝ in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove Bolts *

Packages, nuts loose	71 and 10
In packages, with nuts attached	71
In bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York on lots of 200 lb. or over.

Large Rivets (½ *in. and larger*)

Base per 100 lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham $3.75

Small Rivets (7/16 *in. and smaller*)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham ..... 65 and 5

Cap and Set Screws *Per Cent Off List*

Upset full fin. hexagon head cap screws, coarse or fine thread, up to and incl. 1 in. x 6 in.	64
Upset set screws, cup and oval points	71
Milled studs	46
Flat head cap screws, listed sizes	36
Fillister head cap, listed sizes	51

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

PIG IRON

All prices set in bold face type are maxima established by OPA on June 24, 1941. Other domestic prices (in italics) are delivered quotations per gross ton computed on the basis of the official maxima. Delivered prices do not reflect new 3 per cent tax on freight rates.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorus	Charcoal
Boston††	***$25.53***	***$25.03***	***$26.53***	***$26.03***	....	....
Brooklyn	***27.65***	....	....	***28.15***	....	....
Jersey City	***26.62***	***26.12***	***27.62***	***27.12***	....	....
Philadelphia	***25.89***	***25.39***	***26.89***	***26.39***	....	....
Bethlehem, Pa.	**$25.00**	**$24.50**	**$26.00**	**$25.50**	....	....
Everett, Mass.††	*$25.00*	24.50	26.00	25.50	....	....
Swedeland, Pa.	25.00	24.50	26.00	25.50	....	....
Steelton, Pa.	....	24.50	....	....	**$29.50**	....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	....
Sparrows Point, Md.	25.00	24.50	....	....	....	....
Erie, Pa.	24.00	23.50	25.00	24.50	....	....
Neville Island, Pa.	24.00	23.50	24.50	24.00	....	....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	....	....
Buffalo	24.00	23.00	25.00	24.50	29.50	....
Cincinnati	***24.68***	***24.68***	....	***25.18***	....	....
Canton, Ohio	***25.47***	***24.97***	***25.97***	***25.47***	....	....
Mansfield, Ohio	***26.06***	***25.56***	***26.56***	***26.06***	....	....
St. Louis	***24.50***	***24.00***	....	....	....	....
Chicago	24.00	23.50	24.50	24.00	....	....
Granite City, Ill.	24.00	23.50	24.50	24.00	....	....
Cleveland	24.00	23.50	24.50	24.00	....	....
Hamilton, Ohio	24.00	23.50	....	24.00	....	....
Toledo	24.00	23.50	24.50	24.00	....	....
Youngstown*	24.00	23.50	24.50	24.00	....	....
Detroit	24.00	23.50	24.50	24.00	....	....
Lake Superior fc.	....	....	....	....	....	**$28.00**
Lyles, Tenn. fc.†	....	....	....	....	....	33.00
St. Paul	***26.76***	....	***27.26***	***26.76***	....	....
Duluth	24.50	24.00	25.00	24.50	....	....
Birmingham	20.38	19.00	25.00	....	....	....
Los Angeles	***27.25***	....	....	....	....	....
San Francisco	***27.25***	....	....	....	....	....
Seattle	***27.25***	....	....	....	....	....
Provo, Utah	22.00	21.50	....	....	....	....
Montreal	***27.50***	***27.50***	....	***28.00***	....	....
Toronto	***25.50***	***25.50***	....	***26.00***	....	....

GRAY FORGE IRON: Valley or Pittsburgh furnace $23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

**Pittsburgh Ferromanganese Co. (Chester furnace only) may charge $2.25 a ton over maximum basing point prices.

†Price shown is for low-phosphorous iron; high-phosphorous sells for $28.50 at the furnace.

††Eastern Gas & Fuel Associates, Boston, is permitted to sell pig iron produced by its selling company, Mystic Iron Works, Everett, Mass., at $1 per gross ton above maximum prices.

Delta Chemical & Iron Co., Chicago, may charge $30 for charcoal iron at its Delta, Mich., furnace.

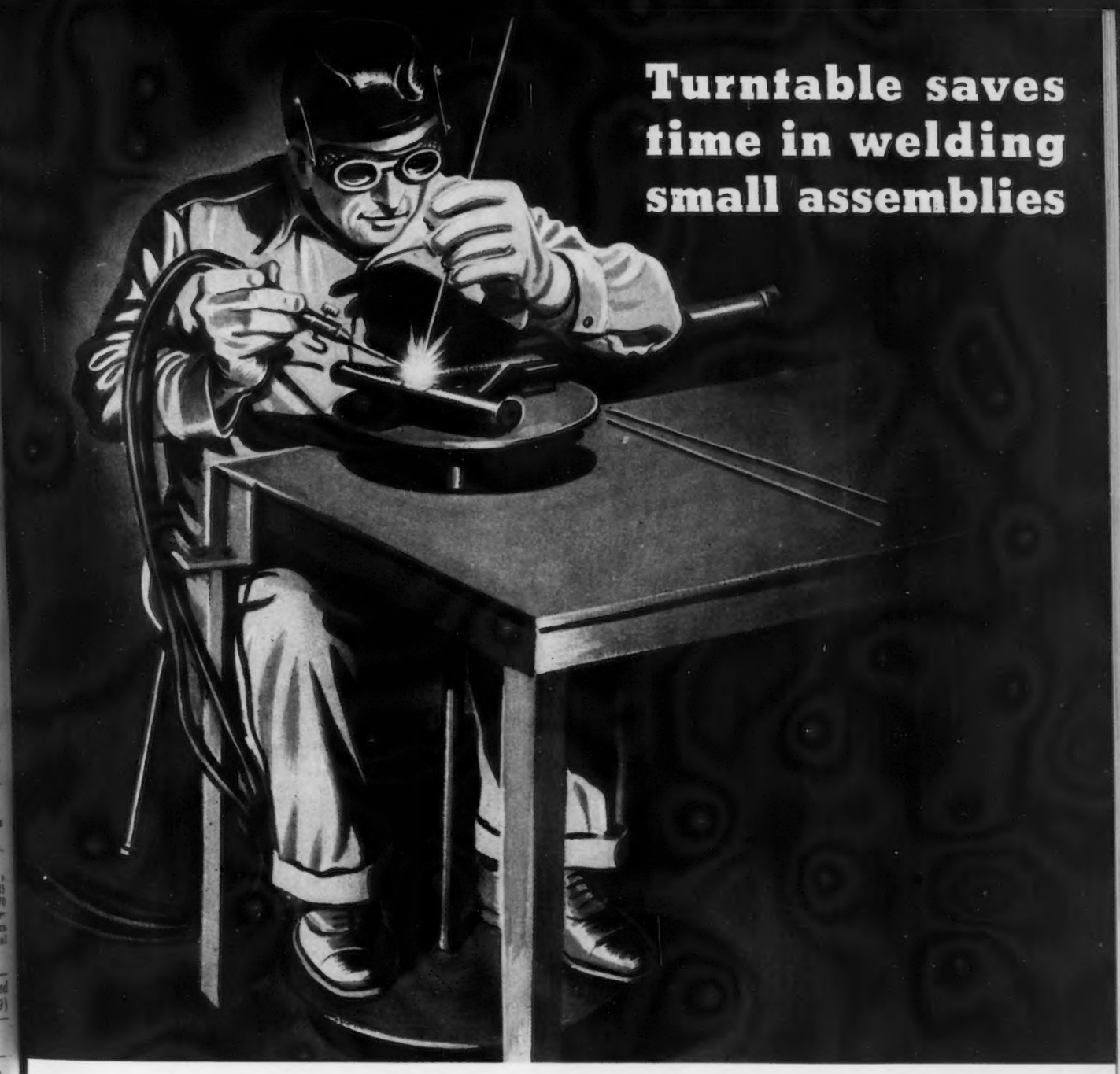
Basing point prices are subject to switching charges; silicon differentials (not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade which is 1.75 per cent to 2.25 per cent); phosphorous differentials, a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over; manganese differentials, a charge not to exceed 50c. per ton for each 0.50 per cent manganese content in excess of 1.00 per cent. Effective March 3, 1943, $2 per ton extra may be charged for 0.05 to 0.075 per cent nickel content and $1 per ton extra for each additional 0.025 per cent nickel.

WAREHOUSE PRICES *(Delivered Metropolitan areas, per 100 lb. These prices do not necessarily apply for dislocated tonnage shipments when the f.o.b. City prices are used in conformance with OPA Schedule 49)*

CITIES	SHEETS			STRIP		Plates (¼ in. and heavier)	Structural Shapes	BARS			ALLOY BARS		
	Hot Rolled (10 ga.)	Cold Rolled	Galv. (24 ga.)	Hot Rolled	Cold Rolled			Hot Rolled	Cold Finished	Hot Rolled 2300	Hot Rolled 3100	Cold Drawn 2300	Cold Drawn 3100
Pittsburgh	$3.35	$4.00	$4.75	$3.60	$3.20	$3.40	$3.40	$3.35	$3.65	$7.45	$5.75	$8.40	$8.75
Chicago	3.25	4.10	4.85[1]	3.60	3.50	3.55	3.55	3.50	3.75	7.35	5.65	8.40	6.75
Cleveland	3.35	4.05	4.62	3.50	3.20	3.40	3.58	3.25	3.75	7.55	5.85	8.40	6.75
Philadelphia	3.55	4.63	4.90	3.95	3.31	3.55	3.55	3.85	4.06	7.31	5.88	8.56	7.18
New York	3.58	4.60[2]	5.00	3.96[6]	3.51	3.76	3.75	3.84	4.09	7.60	5.90	8.84	7.19
Detroit	3.43	4.30	4.84[1]	3.43	3.40	3.60	3.65	3.43	3.80	7.67	5.97	8.70	7.05
Buffalo	3.25	4.30[1]	4.75[4]	3.82	3.52	3.62	3.40	3.35	3.75	7.35	5.65	8.40	6.75
Boston	3.71	4.68	5.11	4.06	3.46	3.85	3.85	3.98	4.13	7.77	6.07	8.91	7.26
Birmingham	3.45[3]	4.78	4.75[1]	3.70[3]	....	3.55[3]	3.55[3]	3.50[3]	4.43	....	....	....	....
St. Louis	3.39	4.24[2]	4.99[1]	3.74	3.61	3.69	3.69	3.64	4.02	7.72	6.02	8.77	7.12
St. Paul	3.50	4.35	5.00	3.85	3.83	3.80	3.80	3.75	4.34	7.45	6.00	8.84	7.44
Milwaukee	3.38	4.23[2]	4.98[1]	3.73	3.54	3.68	3.68	3.63	3.88	7.58	5.88	8.63	6.98
Baltimore	3.50	5.00	5.05	4.00	....	3.70	3.70	3.85	4.04	....	....	....	....
Cincinnati	3.42	4.37[2]	4.92[1]	3.67	3.45	3.65	3.68	3.60	4.00	7.69	5.99	8.50	7.10
Norfolk	3.85	4.50	5.40	4.10	....	4.05	4.05	4.00	4.15	....	....	....	....
Washington	3.60	5.10	5.15	4.10	....	3.80	3.80	3.95	4.03	....	....	....	....
Indianapolis	3.45	4.25	5.01[1]	3.75	3.28	3.70	3.70	3.60	3.97	7.67	5.97	8.72	7.07
Omaha	3.85	4.77	5.52[1]	4.20	....	4.15	4.15	4.10	4.42	....	....	....	....
Memphis	3.85	4.66	5.25	4.10	....	3.95	3.95	3.90	4.31	....	....	....	....
New Orleans	3.95	4.95	5.25	4.20	....	3.90	3.90	4.10	4.60	....	....	....	....
Houston	3.75	5.43	5.25	4.30	....	5.25	5.25	3.75	4.50	....	....	....	....
Los Angeles †	4.95	7.15	5.95	4.90	....	4.90	4.60	4.35	5.70	9.55	8.55	10.55	9.55
San Francisco †	4.55	7.55	6.60	4.50	....	4.65	4.35	3.95	5.55	9.80	8.80	10.80	9.80
Seattle †	4.65[7]	6.63	5.70[7]	4.25	....	4.75	4.45	4.20	5.75	....	8.00	....	....

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: [1] 500 to 1499 lb. [2] 400 to 1499 lb. [3] 400 to 3999 lb. [4] 450 to 1499 lb. [5] 1000 to 1999 lb. [6] 0 to 1999 lb. [7] 300 to 10,000 lb. At Philadelphia galvanized sheets, 25 or more bundles; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; San Francisco, hot rolled sheets, 400 to 39,999 lb., galvanized and cold rolled sheets, 750 to 4999 lb., cold fin. bars, 0-299 lb.; hot rolled alloy bars, 0-4999 lb.; Seattle, cold finished bars, 1000 lb. and over, hot rolled alloy bars, 0-1999 lb.; Memphis, hot rolled sheets, 400 to 1999 lb., galvanized sheets, 150 and over; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, cold rolled sheets, 300 to 1999 lb.; galvanized sheets, 1 to 6 bundles; cold finished bars, 1 to 99 lb.; SAE bars, 100 lb. Extras for size, quality, etc., apply on above quotations.

† Los Angeles, San Francisco and Seattle prices reflect special provisions of amendment No. 2 to OPA Price Schedule No. 49.



Turntable saves time in welding small assemblies

Information supplied by an Industrial Publication

Several means are being applied industrially to save time and reduce fatigue of welders working on heavy jobs. Positioning tables, rotating jigs and similar devices for handling heavy or bulky assemblies are quite generally used.

One aircraft manufacturer has adopted a similar idea for welders working on small sub-assemblies. The assemblies are light, and joints are usually quite accessible. But moving the assemblies by hand does occasion some delay.

This is obviated by mounting the work on a small turn table somewhat resembling an old style potter's wheel. The turn table is quite simple, consisting of two round plates mounted on a common shaft.

The upper plate carries the work, and is located at a convenient height above a work table. The lower plate is a few inches above the shop floor. It is positioned so that the operator's feet rest on it comfortably.

Thus, when the operator wishes to move the work, he simply "indexes" the lower table by foot power. The weight of his feet on the plate is, however, sufficient to hold the whole turn table steady while he is welding any particular joint.

CLIMAX FURNISHES AUTHORITATIVE ENGINEERING DATA ON MOLYBDENUM APPLICATIONS.
MOLYBDIC OXIDE BRIQUETTES • FERROMOLYBDENUM • "CALCIUM MOLYBDATE"

Climax Mo-ly-b-den-um Company
500 Fifth Avenue • New York City

MOLY

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes Minimum Wall
(Net base prices per 100 ft. f.o.b. Pittsburgh, in carload lots)

	Seamless Cold Drawn	Hot Rolled	Lap Weld, Hot Rolled
2 in. o.d. 13 B.W.G.	15.03	13.04	12.38
2½ in. o.d. 12 B.W.G.	20.21	17.54	16.58
3 in. o.d. 12 B.W.G.	22.48	19.50	18.35
3½ in. o.d. 11 B.W.G.	28.37	24.62	23.15
4 in. o.d. 10 B.W.G.	35.20	30.54	28.66

(Extras for less carload quantities)

40,000 lb. or ft. over	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.	65%

CAST IRON WATER PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$54.80
6-in. and larger, del'd New York	52.20
6-in. and larger, Birmingham	46.00
6-in. and larger f.o.b. cars, San Francisco or Los Angeles	69.40
6-in. and larger f.o.b. cars, Seattle	71.20

Class "A" and gas pipe, $3 extra; 4-in. pipe is $3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons or over, 6-in. and larger is $45 at Birmingham and $53.80 delivered Chicago, $59.40 at San Francisco and Los Angeles, and $70.20 at Seattle. Delivered prices do not reflect new 3 per cent tax on freight rates.

WELDED PIPE AND TUBING

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(F.o.b. Pittsburgh only on wrought pipe)
Base Price—$200 per Net Ton

Steel (Butt Weld)

	Black	Galv.
½ in.	63½	51
¾ in.	66½	55
1 to 3 in.	68½	57½

Wrought Iron (Butt Weld)

½ in.	25	3½
¾ in.	30	10
1 and 1¼ in.	34	16
1½ in.	38	18½
2 in.	37½	18

Steel (Lap Weld)

2 in.	61	49½
2½ and 3 in.	64	52½
3½ to 6 in.	66	54½

Wrought Iron (Lap Weld)

2 in.	30½	12
2½ to 3½ in.	31½	14½
4 in.	33½	18
4½ to 8 in.	32½	17

Steel (Butt, extra strong, plain ends)

	Black	Galv.
½ in.	61½	50½
¾ in.	65½	54½
1 to 3 in.	67	57

Wrought Iron (Same as Above)

½ in.	25	6
¾ in.	31	12
1 to 2 in.	38	19½

Steel (Lap, extra strong, plain ends)

2 in.	59	48½
2½ and 3 in.	63	52½
3½ to 6 in.	66½	56

Wrought Iron (Same as Above)

2 in.	33½	15½
2½ to 4 in.	39	22½
4½ to 6 in.	37½	21

On butt weld and lap weld steel pipe jobbers are granted a discount of 5%. On less-than-carload shipments prices are determined by adding 25 and 30% and the carload freight rate to the base card.

F.o.b. Gary prices are two points lower discount or $4 a ton higher than Pittsburgh or Lorain on lap weld and one point lower discount, or $2 a ton higher on all butt weld.

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans, Domestic, 80%, per gross ton (carloads) $135.00

Electrolytic Manganese

99.9¼ plus, less ton lots, per lb. 42c.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$36.00
Domestic, 26 to 29%	49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)

50% (carload lots, bulk)	$74.50
50% (ton lots, packed)	87.00
75% (carload lots, bulk)	135.00
75% (ton lots, packed)	151.00

Silvery Iron

(Per Gross Ton, base 6.00 to 6.50 Si)
F.o.b. Jackson, Ohio $29.50*
Buffalo 30.75*
For each additional 0.50% silicon add $1 a ton. For each 0.50% manganese over 1% add 50c. a ton. Add $1 a ton for 0.75% phosphorus or over.
*Official OPA price established June 24, 1941.

Bessemer Ferrosilicon

Prices are $1 a ton above Silvery Iron quotations of comparable analysis.

Ferrochrome

(Per Lb., Contained Cr, Delivered Carlots, Lump Size, on Contract)

4 to 6 carbon	13.00c.
2 carbon	19.50c.
1 carbon	20.50c.
0.10 carbon	22.50c.
0.06 carbon	23.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Carloads, Bulk)

3 carbon	$120.00
2.50 carbon	125.00
2 carbon	130.00
1 carbon	140.00

Other Ferroalloys

Ferrotungsten, per lb. contained W, del'd carload	$2.00
Ferrovanadium, contract, per lb. contained V, del'd	$2.70 to $2.90†
Grainal—per lb., f.o.b. Bridgeville, Pa. Freight allowed 100 lb. and over; maximum based on rate to St. Louis, Mo.	
Bortam—per lb. in ton lots: 45c. per lb. less than ton, f.o.b. Niagara Falls.	
Ferrocolumbium, per lb. contained Cb, f.o.b. Niagara Falls, N. Y., ton lots	$2.25†
Ferrocarbontitanium, 15-18 Ti, 718 C, f.o.b. furnace, carload contract, net ton	$142.50
Ferrocarbontitanium, 17-20 Ti, 3-5 C, f.o.b. furnace, carload contract, net ton	$157.50
Ferrophosphorus, electric or blast furnace materials, carloads, f.o.b. Anniston, Ala., for 18% with $3 unitage freight, equaled with Rockdale, Tenn., gross ton	$58.50
Ferrophosphorus, electrolytic 23-26%, carlots, f.o.b. Monsanto (Siglo), Tenn., $3 unitage, freight equalized with Nashville, gross ton	$75.00
Ferromolybdenum, per lb., Mo, f.o.b. furnace	95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace	80c.
Molybdenum oxide briquettes 48-52 Mo, per lb. contained Mo, f.o.b. Langeloth, Pa.	80c.
Molybdenum oxide, in cans, per lb. contained Mo, f.o.b. Langeloth, and Washington, Pa.	80c.
Zirconium, 35-40%, contract basis, carloads in bulk or package, per lb. of alloy	15c.
Alsifer (approx. 20% Al, 40% Si and 40% Fe), contract basis, f.o.b. Niagara Falls, N. Y., per lb.	7.50c.
Simanal (approx. 20% Si, 20% Mn, 20% Al), contract basis, freight allowed, per lb. of alloy, carlots	10.50c.

*Spot prices are $5 per ton higher.
†Spot prices are 10c. per lb. of contained element higher.

LAKE SUPERIOR ORES

(51.50% Fe, Natural Content, Delivered Lower Lake Ports)

	Per Gross Ton
Old range, bessemer, 51.50	$4.75
Old range, non-bessemer, 51.50	4.60
Mesaba, bessemer, 51.50	4.60
Mesaba, non-bessemer, 51.50	4.45
High phosphorous, 51.50	4.35

COKE

Furnace

	Per Net Ton
†Connellsville, prompt	*$6.50

Foundry

†Connellsville, prompt	$7.25 to $7.50
By-product, Chicago	$12.25
By-product, New England	$13.75
By-product, Newark	$12.40 to $12.95
By-product, Philadelphia	$12.38
By-product, Cleveland	$12.30
By-product, Cincinnati	$11.75
By-product, Birmingham	$8.50†
By-product, St. Louis	$12.02
By-product, Buffalo	$12.50

Maximum by-product coke prices established by OPA became effective Oct. 1, 1941.
*Hand-drawn ovens using trucked coal are permitted to charge $7.00 per net ton, plus usual transportation. Maximum beehive furnace coke prices established by OPA, Feb. 8, 1942. †F.O.B. oven.

FLUORSPAR

	Per Net Ton
Domestic washed gravel, 85-5 f.o.b. Kentucky and Illinois mines, all rail	$25.00
Domestic, f.o.b. Ohio River landing barges	25.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines	25.00

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick

	Per 1000
Super-duty brick, St. Louis	$64.60
First quality, Penna., Md., Ky., Mo. & Ill.	51.30
First quality, New Jersey	56.00
Second quality, Penna., Md., Ky., Mo. & Ill.	46.55
Second quality, New Jersey	51.00
No. 1, Ohio	43.00
Ground fire clay, net ton	7.60

Silica Brick

Pennsylvania & Birmingham	$51.30
Chicago District	58.90
Silica cement, net ton (Eastern)	9.00

Chrome Brick *Per Net Ton*

Standard or chemically bonded, Balt., Plymouth Meeting and Chester $54.00

Magnesite Brick

Standard, Balt. and Chester	$76.00
Chemically bonded, Baltimore	65.00

Grain Magnesite

Domestic, f.o.b. Balt. and Chester in sacks (carloads)	$44.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00